CIGWELD Professional

200 Pi

TRANSTIG®

INVERTER ARC WELDER

Service Manual

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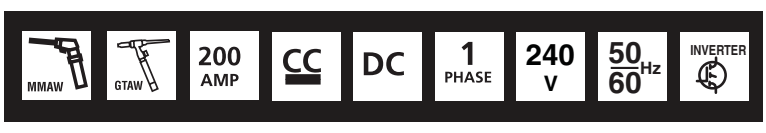
Operating Features:

CE



WE APPRECIATE YOUR BUSINESS!

Congratulations on your new Cigweld product. We are proud to have you as our customer and will strive to provide you with the best service and reliability in the industry. This product is backed by our extensive warranty and world-wide service network. To locate your nearest distributor or service agency call 1300-654-674, or visit us on the web at **www.cigweld.com.au.**

This Operating Manual has been designed to instruct you on the correct use and operation of your CIGWELD product. Your satisfaction with this product and its safe operation is our ultimate concern. Therefore please take the time to read the entire manual, especially the Safety Precautions. They will help you to avoid potential hazards that may exist when working with this product.

YOU ARE IN GOOD COMPANY!

The Brand of Choice for Contractors and Fabricators Worldwide.

CIGWELD is the Market Leading Brand of Arc Welding Products for Thermadyne Industries Inc. We are a mainline supplier to major welding industry sectors in the Asia Pacific and emerging global markets including; Manufacturing, Construction, Mining, Automotive, Aerospace, Engineering, Rural and DIY/Hobbyist.

We distinguish ourselves from our competition through market-leading, dependable brands that have stood the test of time. We pride ourselves on technical innovation, competitive prices, excellent delivery, superior customer service and technical support, together with excellence in sales and marketing expertise.

Above all, we are committed to develop technologically advanced products to achieve a safer working environment for industry operators.

WARNINGS

Read and understand this entire Manual and your employer's safety practices before installing, operating, or servicing the equipment.

While the information contained in this Manual represents the Manufacturer's best judgement, the Manufacturer assumes no liability for its use.

Transtig 200Pi Inverter Arc Welder
Instruction Manual Number 0-4967 for:
Catalog Number 700720

Published by:
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www.thermadyne.com

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Record the following information for Warranty purposes:

Where Purchased: _____

Purchase Date: _____

Equipment Serial #: _____

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CIGWELD LIMITED WARRANTY

Terms of Warranty – December 2007

Warranty Schedule – December 2007

GLOBAL CUSTOMER SERVICE CONTACT INFORMATION ..... Inside Rear Cover

SECTION 1:
ARC WELDING SAFETY INSTRUCTIONS AND WARNINGS

WARNING

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR. DO NOT LOSE THESE INSTRUCTIONS. READ OPERATING/INSTRUCTION MANUAL BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.

Welding products and welding processes can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions.

Safe practices have developed from past experience in the use of welding and cutting. These practices must be learned through study and training before using this equipment. Some of these practices apply to equipment connected to power lines; other practices apply to engine driven equipment. Anyone not having extensive training in welding and cutting practices should not attempt to weld.

Safe practices are outlined in the Australian Standard AS1674.2-2007 entitled: Safety in welding and allied processes Part 2: Electrical. This publication and other guides to what you should learn before operating this equipment are listed at the end of these safety precautions. **HAVE ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR WORK PERFORMED ONLY BY QUALIFIED PEOPLE.**

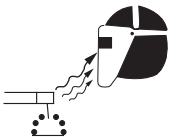
1.01 Arc Welding Hazards

WARNING

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Disconnect input power or stop engine before installing or servicing this equipment. Lock input power disconnect switch open, or remove line fuses so power cannot be turned on accidentally.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. Turn off all equipment when not in use. Disconnect power to equipment if it will be left unattended or out of service.
7. Use fully insulated electrode holders. Never dip holder in water to cool it or lay it down on the ground or the work surface. Do not touch holders connected to two welding machines at the same time or touch other people with the holder or electrode.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not wrap cables around your body.
10. Ground the workpiece to a good electrical (earth) ground.
11. Do not touch electrode while in contact with the work (ground) circuit.
12. Use only well-maintained equipment. Repair or replace damaged parts at once.
13. In confined spaces or damp locations, do not use a welder with AC output unless it is equipped with a voltage reducer. Use equipment with DC output.
14. Wear a safety harness to prevent falling if working above floor level.
15. Keep all panels and covers securely in place.



WARNING

ARC RAYS can burn eyes and skin; NOISE can damage hearing.

Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.

1. Wear a welding helmet fitted with a proper shade of filter (see ANSI Z49.1 listed in Safety Standards) to protect your face and eyes when welding or watching.
2. Wear approved safety glasses. Side shields recommended.
3. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
5. Use approved ear plugs or ear muffs if noise level is high.

WARNING

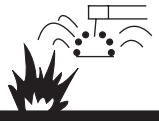
FUMES AND GASES can be hazardous to your health.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

1. Keep your head out of the fumes. Do not breath the fumes.
2. If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
6. Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
7. Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

Eye protection filter shade selector for welding or cutting (goggles or helmet), from AWS A 8.2-73

Welding or Cutting operation	Electrode size Metal Thickness or Welding Current	Filter shade no.	Welding or Cutting operation	Electrode size Metal Thickness or Welding Current	Filter shade no.
Torch soldering	All	2	Gas metal arc welding		
Torch brazing	All	2 or 3	Non Ferrous base metal	All	11
Oxygen cutting			Ferrous base metal	All	12
Light	Under 1 in., 25 mm	3 or 4	Gas tungsten arc welding (TIG)	All	12
Medium	1 – 6 in., 25 – 150 mm	4 or 5	Atomic Hydrogen welding	All	12
Heavy	Over 6 in., 150 mm	5 or 6	Carbon Arc welding	All	12
Gas welding			Plasma arc Welding	All	12
Light	Under 1/8 in., 3 mm	4 or 5	Carbon Arc Gouging		
Medium	1/8 – 1/2 in., 3 – 12 mm	5 or 6	Light		12
Heavy	Over 1/2 in., 12 mm	6 or 8	Heavy		14
Shielded metal-arc welding (stick) electrodes			Plasma arc cutting		
	Under 5/32 in., 4 mm	10	Light	Under 300 Amp	9
	Under 5/32 to ¼ in., 4 to 6.4mm	12	Medium	300 to 400 Amp	12
	Over ¼ in., 6.4 mm	14	Heavy	Over 400 Amp	14



WARNING

WELDING can cause fire or explosion.

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.

1. Protect yourself and others from flying sparks and hot metal.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
4. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Do not weld on closed containers such as tanks or drums.
8. Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
9. Do not use welder to thaw frozen pipes.
10. Remove stick electrode from holder or cut off welding wire at contact tip when not in use.

WARNING

FLYING SPARKS AND HOT METAL can cause injury.

Chipping and grinding cause flying metal. As welds cool, they can throw off slag.

1. Wear approved face shield or safety goggles. Side shields recommended.
2. Wear proper body protection to protect skin.

WARNING

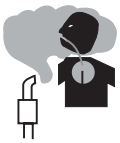
CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinder is in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

WARNING

Engines can be dangerous.



WARNING

ENGINE EXHAUST GASES can kill.

Engines produce harmful exhaust gases.

1. Use equipment outside in open, well-ventilated areas.
2. If used in a closed area, vent engine exhaust outside and away from any building air intakes.

WARNING

ENGINE FUEL can cause fire or explosion.

Engine fuel is highly flammable.

1. Stop engine before checking or adding fuel.
2. Do not add fuel while smoking or if unit is near any sparks or open flames.
3. Allow engine to cool before fueling. If possible, check and add fuel to cold engine before beginning job.
4. Do not overfill tank — allow room for fuel to expand.
5. Do not spill fuel. If fuel is spilled, clean up before starting engine.

WARNING

MOVING PARTS can cause injury.

Moving parts, such as fans, rotors, and belts can cut fingers and hands and catch loose clothing.

1. Keep all doors, panels, covers, and guards closed and securely in place.
2. Stop engine before installing or connecting unit.
3. Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
4. To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.
5. Keep hands, hair, loose clothing, and tools away from moving parts.
6. Reinstall panels or guards and close doors when servicing is finished and before starting engine.

WARNING

SPARKS can cause BATTERY GASES TO EXPLODE; BATTERY ACID can burn eyes and skin.

Batteries contain acid and generate explosive gases.

1. Always wear a face shield when working on a battery.
2. Stop engine before disconnecting or connecting battery cables.
3. Do not allow tools to cause sparks when working on a battery.
4. Do not use welder to charge batteries or jump start vehicles.
5. Observe correct polarity (+ and –) on batteries.

WARNING

STEAM AND PRESSURIZED HOT COOLANT can burn face, eyes, and skin.

The coolant in the radiator can be very hot and under pressure.

1. Do not remove radiator cap when engine is hot. Allow engine to cool.
2. Wear gloves and put a rag over cap area when removing cap.
3. Allow pressure to escape before completely removing cap.

WARNING

This product, when used for welding or cutting, produces fumes or gases which contain chemicals know to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety code Sec. 25249.5 et seq.)

NOTE

Considerations About Welding And The Effects of Low Frequency Electric and Magnetic Fields

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, Biological Effects of Power Frequency Electric & Magnetic Fields - Background Paper, OTA-BP-E-63 (Washington, DC: U.S. Government Printing Office, May 1989): "...there is now a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields and interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks."

To reduce magnetic fields in the workplace, use the following procedures.

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cable around the body.
4. Keep welding power source and cables as far away from body as practical.

ABOUT PACEMAKERS:

The above procedures are among those also normally recommended for pacemaker wearers. Consult your doctor for complete information.

1.02 PRINCIPAL SAFETY STANDARDS

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safety in welding and allied processes Part 2: Electrical, AS1674.2-2007 from SAI Global Limited, www.saiglobal.com

1.03 DECLARATION OF CONFORMITY

Manufacturer: CIGWELD
Address: 71 Gower St, Preston
Victoria 3072

Australia

Description of equipment: Welding Equipment (GMAW, MMAW, GTAW). Including, but not limited to CIGWELD Transtig 200 Pi, Transtig 200 AC/DC, Transarc 300 Si, Transtig 300 Pi, Transtig 300 AC/DC, Transmig 400 i and associated accessories.

Serial numbers are unique with each individual piece of equipment and details description, parts used to manufacture a unit and date of manufacture.

The equipment conforms to all applicable aspects and regulations of the 'Low Voltage Directive' (Directive 73/23/EU, as recently changed in Directive 93/68/EU and to the National legislation for the enforcement of the Directive.

National Standard and Technical Specifications

The product is designed and manufactured to a number of standards and technical requirements among them are:

- AS/NZS 3652-(EMC Directive EN50199) applicable to arc welding equipment - generic emissions and regulations.
- EN60974-1 applicable to welding equipment and associated accessories.
- AS60974.1 applicable to welding equipment and associated accessories.

Extensive product design verification is conducted at the manufacturing facility as part of the routine design and manufacturing process, to ensure the product is safe and performs as specified. Rigorous testing is incorporated into the manufacturing process to ensure the manufactured product meets or exceeds all design specifications.

CIGWELD has been manufacturing and merchandising an extensive equipment range with superior performance, ultra safe operation and world class quality for more than 30 years and will continue to achieve excellence.

SECTION 2: INTRODUCTION

2.01 How To Use This Manual

This Owner's Manual applies to just specification or part numbers listed on page i.

To ensure safe operation, read the entire manual, including the chapter on safety instructions and warnings.

Throughout this manual, the words **WARNING, CAUTION**, and **NOTE** may appear. Pay particular attention to the information provided under these headings. These special annotations are easily recognized as follows:

WARNING

A WARNING gives information regarding possible personal injury.

CAUTION

A CAUTION refers to possible equipment damage.

NOTE

A NOTE offers helpful information concerning certain operating procedures.

Additional copies of this manual may be purchased by contacting Cigweld at the address and phone number for your location listed in the inside back cover of this manual. Include the Owner's Manual number and equipment identification numbers.

Electronic copies of this manual can also be downloaded at no charge in Acrobat PDF format by going to the Cigweld web site listed below and clicking on the Literature Library link:

http://www.cigweld.com.au

2.02 Equipment Identification

The unit's identification number (specification or part number), model, and serial number usually appear on a nameplate attached to the control panel. In some cases, the nameplate may be attached to the rear panel. Equipment which does not have a control panel such as gun and cable assemblies is identified only by the specification or part number printed on the shipping container. Record these numbers on the bottom of page i for future reference.

2.03 Receipt Of Equipment

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify the carrier immediately to file a claim. Furnish complete information concerning damage claims or shipping errors to the location in your area listed in the inside back cover of this manual.

Include all equipment identification numbers as described above along with a full description of the parts in error.

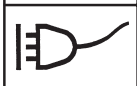
Move the equipment to the installation site before uncrating the unit. Use care to avoid damaging the equipment when using bars, hammers, etc., to uncrate the unit.

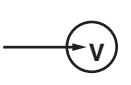
CAUTION

The products applicable to this Service Manual are manufactured in various configurations for differing global requirements. Some specifications and and electrical data quoted within this Service Manual may not be applicable to all products and regions. For this reason due caution and care must be exercised when using this Service Manual.

2.04 Symbol Chart

Note that only some of these symbols will appear on your model.

	On
	Off
	Dangerous Voltage
	Increase/Decrease
	Circuit Breaker
	AC Auxiliary Power
	Fuse
	Amperage
	Voltage
	Hertz (cycles/sec)
	Frequency
	Negative
	Positive
	Direct Current (DC)
	Protective Earth (Ground)
	Line
	Line Connection
	Auxiliary Power
	Receptacle Rating- Auxiliary Power

	Single Phase
	Three Phase
	Three Phase Static Frequency Converter-Transformer-Rectifier
	Remote
	Duty Cycle
	Percentage
	Panel/Local
	Shielded Metal Arc Welding (SMAW)
	Gas Metal Arc Welding (GMAW)
	Gas Tungsten Arc Welding (GTAW)
	Air Carbon Arc Cutting (CAC-A)
	Constant Current
	Constant Voltage Or Constant Potential
	High Temperature
	Fault Indication
	Arc Force
	Touch Start (GTAW)
	Variable Inductance
	Voltage Input

	Wire Feed Function
	Wire Feed Towards Workpiece With Output Voltage Off.
	Welding Gun
	Purging Of Gas
	Continuous Weld Mode
	Spot Weld Mode
	Spot Time
	Preflow Time
	Postflow Time
	2 Step Trigger Operation Press to initiate wirefeed and welding, release to stop.
	4 Step Trigger Operation Press and hold for preflow, release to start arc. Press to stop arc, and hold for preflow.
	Burnback Time
	Disturbance In Ground System
IPM	Inches Per Minute
MPM	Meters Per Minute

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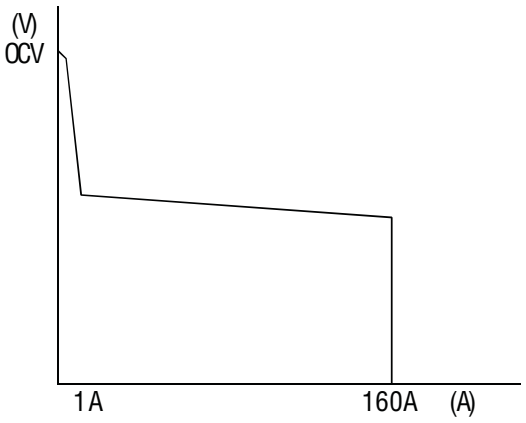
2.05 Description

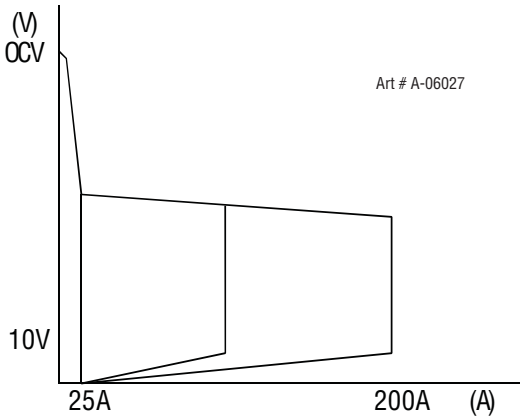
The Cigweld Transtig 200 Pi is a self contained single-phase DC arc welding power source with Constant Current (CC) output characteristics. This unit is equipped with a Digital Volt/Amperage Meter, gas control valve, built in Sloper and Pulser, lift arc starter, and high-frequency arc starter for use with Gas Tungsten Arc Welding (GTAW), Gas Tungsten Arc Welding-Pulsed (GTAW-P) Gas Tungsten Arc Welding-Sloped (GTAW-S), and Shielded Metal Arc Welding (SMAW) processes. The power source is totally enclosed in an impact resistant, flame resistant and non-conductive plastic case.

NOTE

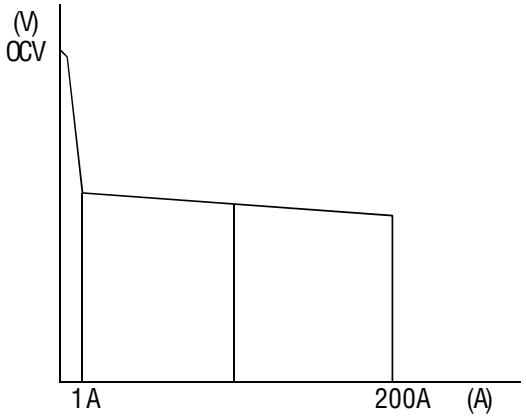
Volt-Ampere curves show the maximum Voltage and Amperage output capabilities of the welding power source. Curves of other settings will fall between the curves shown.



STICK Process



LIFT TIG Process

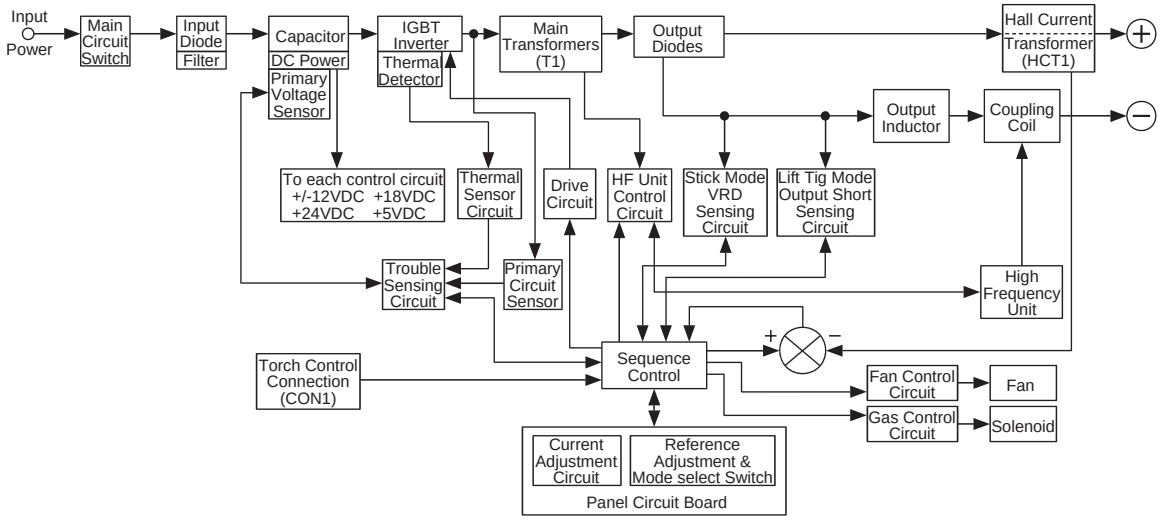


HF TIG Process

Figure 2-1: Transtig 200 Pi Volt-Ampere Curves

2.06 Functional Block Diagrams

Figure 2-2 illustrates the functional block diagram of the Transtig 200 Pi power source.



Art # A-06029

Figure 2-2: Transtig 200 Pi Functional Block Diagram

2.07 Transporting Methods

These units are equipped with a handle for carrying purposes.

WARNING

ELECTRIC SHOCK can kill. DO NOT TOUCH live electrical parts. Disconnect input power conductors from de-energized supply line before moving the welding power source.

WARNING

FALLING EQUIPMENT can cause serious personal injury and equipment damage.

Lift unit with handle on top of case.

Use handcart or similar device of adequate capacity.

If using a fork lift vehicle, place and secure unit on a proper skid before transporting.

2.08 Specifications

Parameter	Transtig 200Pi
Power Source Part Number	700720
Cooling	Fan Cooled
Welder Type	Inverter Power Source
Welding Power Source Mass	8kg
Dimensions	H 260mm x W 130mm x L 320mm
Manufactured to Australian Standard	AS 60974.1-2006
Number of Phases	1
Nominal Supply Voltage	240V ±15%
Nominal Supply Frequency	50Hz
Protection Class	IP23S

Standard Specifications (Applicable with factory fitted Supply Plug)

Parameter	Transtig 200Pi
Welding Current Range	5 - 200 Amps
Open Circuit Voltage	65V
Factory Fitted Supply Plug Rating	15 Amps
Effective Input Current (I1eff)	15 Amps
Maximum Input Current (I1 max)	36.7 Amps
Single Phase Generator Requirement	8.8 KVA
Welding Output 40^{0}C, 10 min (Quoted figures refer to MMAW output)	160A @ 15%, 26.4V 80A @ 60%, 23.2V 62A @ 100%, 22.5V
Welding Output 40^{0}C, 10 min (Quoted figures refer to GTAW output)	200A @ 20%, 18.0V 130A @ 60%, 15.2V 100A @ 100%, 14.0V

Upgraded Specifications (Applicable with upgraded Supply Plug)

Parameter	Transtig 200Pi
Welding Current Range	5 - 200 Amps
Open Circuit Voltage	65V
Upgraded Supply Plug Rating Required	25 Amps
Effective Input Current (I1eff)	21.7 Amps
Maximum Input Current (I1 max)	36.7 Amps
Single Phase Generator Requirement	8.8 KVA
Welding Output 40^{0}C, 10 min (Quoted figures refer to MMAW output)	160A @ 35%, 26.4V 130A @ 60%, 25.2V 100A @ 100%, 24.0V
Welding Output 40^{0}C, 10 min (Quoted figures refer to GTAW output)	200A @ 20%, 18.0V 130A @ 60%, 15.2V 100A @ 100%, 14.0V

Table 2-1: Specifications

Cigweld continuously strives to produce the best product possible and therefore reserves the right to change, improve or revise the specifications or design of this or any product without prior notice. Such updates or changes do not entitle the buyer of equipment previously sold or shipped to the corresponding changes, updates, improvements or replacement of such items.

The values specified in the table above are optimal values, your values may differ. Individual equipment may differ from the above specifications due to in part, but not exclusively, to any one or more of the following; variations or changes in manufactured components, installation location and conditions and local power grid supply conditions.

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SECTION 3: INSTALLATION

3.01 Environment

The Transtig 200 Pi is designed for use in hazardous environments. Examples of environments with increased hazardous environments are:

a. In locations in which freedom of movement is restricted, so that the operator is forced to perform the work in a cramped (kneeling, sitting or lying) position with physical contact with conductive parts;

b. In locations which are fully or partially limited by conductive elements, and in which there is a high risk of unavoidable or accidental contact by the operator, or

c. In wet or damp hot locations where humidity or perspiration considerably reduces the skin resistance of the human body and the insulation properties of accessories.

Environments with hazardous environments do not include places where electrically conductive parts in the near vicinity of the operator, which can cause increased hazard, have been insulated.

3.02 Location

Be sure to locate the welder according to the following guidelines:

- In areas, free from moisture and dust.
- Ambient temperature between 0 degrees C to 40 degrees C.
- In areas, free from oil, steam and corrosive gases.
- In areas, not subjected to abnormal vibration or shock.
- In areas, not exposed to direct sunlight or rain.
- Place at a distance of 12” (304.79mm) or more from walls or similar that could restrict natural airflow for cooling.

WARNING

Cigweld advises that this equipment be electrically connected by a qualified electrician.

3.03 Electrical Input Connections

WARNING

ELECTRIC SHOCK can kill; SIGNIFICANT DC VOLTAGE is present after removal of input power.

DO NOT TOUCH live electrical parts.

SHUT DOWN welding power source, disconnect input power employing lockout/tagging procedures. Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

3.04 Mains Supply Voltage Requirements

The Mains supply voltage should be within ± 15% of the rated Mains supply voltage. Too low a voltage may cause the fuse or circuit breaker to rupture due to the increased primary current. Too high a supply voltage will cause the Power Source to fail.

240V Mains Current Circuit Requirements for the Transtig 200 Pi

The Welding Power Source must be:

- Correctly installed, if necessary, by a qualified electrician.
- Correctly earthed (electrically) in accordance with local regulations.
- Connected to the correct size 240V Mains Current Circuit as per the Specifications

WARNING

CIGWELD advises that this equipment be electrically connected by a qualified electrical trades-person.

The following 240V Mains Current Circuit recommendations are required to obtain the maximum welding current and duty cycle from this welding equipment:

NOTE

This product has been fitted with a 15 amp input supply plug as standard. In order to achieve maximum welding output and duty cycle, it is recommended to increase the rating of the supply plug as indicated below.

Model	Mains Supply Lead Size (Factory Fitted)	Minimum 240V Mains Current Circuit Size	Input Supply Plug Current Rating
Transtig 200 Pi	2.5 mm2	36.7 Amps	25A

3.05 High Frequency Introduction

The importance of correct installation of high frequency welding equipment cannot be overemphasized. Interference due to high frequency initiated or stabilized arc is almost invariably traced to improper installation. The following information is intended as a guide for personnel installing high frequency welding machines.

WARNING: EXPLOSIVES

The high frequency section of this machine has an output similar to a radio transmitter. The machine should NOT be used in the vicinity of blasting operations due to the danger of premature firing.

WARNING: COMPUTERS

It is also possible that operation close to computer installations may cause computer malfunction.

3.06 High Frequency Interference

Interference may be transmitted by a high frequency initiated or stabilized arc welding machine in the following ways:

1. **Direct Radiation:** Radiation from the machine can occur if the case is metal and is not properly grounded. It can occur through apertures such as open access panels. The shielding of the high frequency unit in the Power Source will prevent direct radiation if the equipment is properly grounded.
2. **Transmission via the Supply Lead:** Without adequate shielding and filtering, high frequency energy may be fed to the wiring within the installation (mains) by direct coupling. The energy is then transmitted by both radiation and conduction. Adequate shielding and filtering is provided in the Power Source.
3. **Radiation from Welding Leads:** Radiated interference from welding leads, although pronounced in the vicinity of the leads, diminishes rapidly with distance. Keeping leads as short as possible will minimize this type of interference. Looping and suspending of leads should be avoided where possible.
4. **Re-radiation from Unearthed Metallic Objects:** A major factor contributing to interference is re-radiation from unearthed metallic objects close to the welding leads. Effective grounding of such objects will prevent re-radiation in most cases.

3.07 Duty Cycle

The duty cycle of a welding power source is the percentage of a ten (10) minute period that it can be operated at a given output without causing overheating and damage to the unit. If the welding amperes decrease, the duty cycle increases. If the welding amperes are increased beyond the rated output, the duty cycle will decrease.

WARNING

Exceeding the duty cycle ratings will cause the thermal overload protection circuit to become energized and shut down the output until the unit has cooled to normal operating temperature.

CAUTION

Continually exceeding the duty cycle ratings can cause damage to the welding power source and will void the manufactures warranty.

NOTE

Due to variations that can occur in manufactured products, claimed performance, voltages, ratings, all capacities, measurements, dimensions and weights quoted are approximate only. Achievable capacities and ratings in use and operation will depend upon correct installation, use, applications, maintenance and service.

SECTION 4: OPERATION

4.01 Transtig 200 Pi Controls

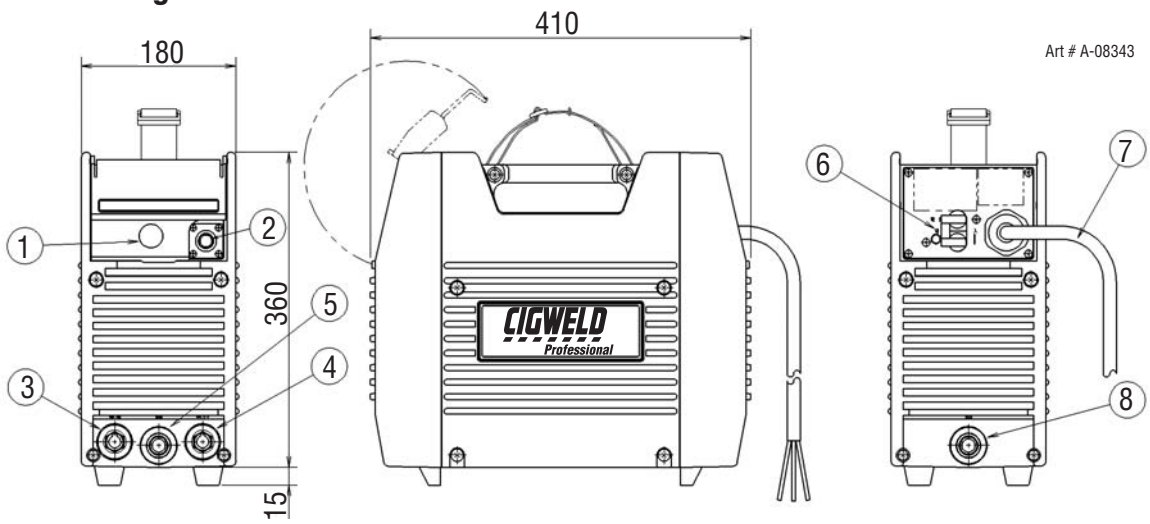
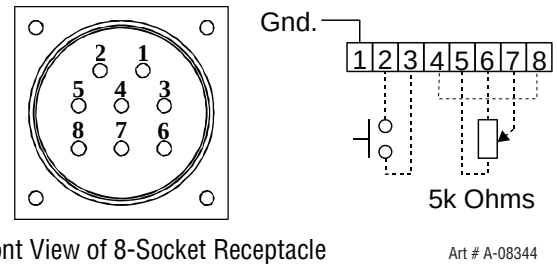


Figure 4-1: Transtig 200 Pi Power Source

1. **Control Knob:** This control sets the selected weld parameter, rotating it clockwise increases the parameter and is indicated on the digital meter. Pushing the knob inward displays the actual welding voltage.
2. **Remote Control Socket:** The 8 pin Remote Control Socket is used to connect remote current control devices to the welding Power Source. To make connections, align keyway, insert plug, and rotate threaded collar fully clockwise.



Front View of 8-Socket Receptacle

Figure 4-2: Front view of 8-Socket Receptacle

3. **Positive Terminal:** Welding current flows from the Power Source via heavy duty Dinse type terminal. It is essential, however, that the male plug is inserted and turned securely to achieve a sound electrical connection.
4. **Negative Terminal:** Welding current flows from the Power Source via heavy duty Dinse type terminal. It is essential, however, that the male plug is inserted and turned securely to achieve a sound electrical connection.

Socket Pin	Function
1	Earth (Ground)
2	Torch Switch Input (24V) to energize weld current. (connect pins 2 & 3 to turn on welding current)
3	Torch Switch Input (0V) to energize weld current (connect pins 2 & 3 to turn on welding current)
4	Connect pin 4 to pin 8 to instruct machine that a remote current control device is connected (12V DC supply)
5	5k ohm (maximum) connection to 5k ohm remote control potentiometer
6	Zero ohm (minimum) connection to 5k ohm remote control potentiometer
7	Wiper arm connection to 5k ohm remote control potentiometer
8	Connect pin 4 to pin 8 to instruct machine that a remote current control device is connected (0V)

Table 4-1: Socket Pin Functions

CAUTION

Loose welding terminal connections can cause overheating and result in the male plug being fused in the bayonet terminal.

5. **Gas Outlet:** The Gas Outlet is a 5/8-18 UNF female gas fitting.
6. **ON/OFF Switch:** This switch connects the Primary supply voltage to the inverter when in the ON position. This enables the Power Supply.

WARNING

When the welder is connected to the Primary supply voltage, the internal electrical components maybe at 240V potential with respect to earth.

7. **Input Cable:** The input cable connects the Primary supply voltage to the equipment.
8. **Gas Inlet:** The Gas Inlet is a 5/8-18 UNF female gas fitting.

4.02 Weld Process Selection for Transtig 200 Pi

Weld Process Selection	Weld Mode			Description
	STICK	HF TIG	LIFT TIG	
STD	Yes	Yes	Yes	2T operation in TIG Modes using remote devices to control contactor & current
SLOPE	No	Yes	Yes	4T operation in TIG Modes with crater fill using a remote contactor device to control sequence.
REPEAT	No	Yes	Yes	4T operation in TIG Modes with repeat operation and crater fill using a remote contactor device.
SPOT	No	Yes	No	2T operation spot welding in HF TIG using a remote contactor device.
PULSE ON/OFF	No	Yes	Yes	Pulse operation in TIG Modes

Table 4-2: Weld Process Selection Versus Weld Mode for Transtig 200 Pi

4.03 Weld Parameter Descriptions for Transtig 200 Pi

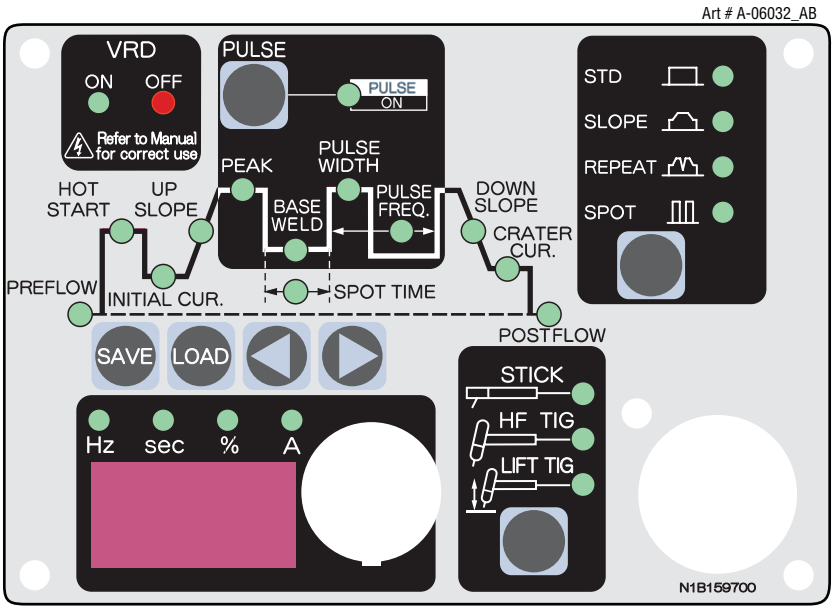


Figure 4-3: Transtig 200 Pi Front Panel

Parameter	Description
PRE-FLOW	This parameter operates in TIG modes only and is used to get gas to the weld zone prior to striking the arc, once the torch trigger switch has been pressed. This control is used to dramatically reduce weld porosity at the start of a weld.
HOT START	This parameter operates in all weld modes except Lift TIG mode and is used to heat up the weld zone in TIG modes or improve the start characteristics for stick electrodes. e.g. low hydrogen electrodes. It sets the peak start current on top of the *BASE (WELD)* current. e.g. *HOT START* current = 130 amps when *BASE (WELD)* = 100 amps & *HOT START* = 30 amps
INITIAL CUR.	This parameter operates in *SLOPE* or *REPEAT* (4T) TIG modes only and is used to set the start current for TIG. The Start Current remains on until the torch trigger switch is released after it has been depressed.
UP SLOPE	This parameter operates in TIG modes only and is used to set the time for the weld current to ramp up, after the torch trigger switch has been pressed then released, from INITIAL CUR to PEAK or BASE current
PEAK CUR.	This parameter sets the PEAK weld current when in *PULSE* mode
WELD	This parameter sets the TIG WELD current in *STD*, *SLOPE*, *REPEAT* and *SPOT* modes when *PULSE* is off. This parameter also sets the STICK weld current.
BASE (Background Current)	This parameter sets the Background current when in Pulse TIG mode.
SPOT TIME	This parameter sets the duration of the *SPOT TIME* in *HF TIG* mode only
PULSE WIDTH	This parameter sets the percentage on time of the *PULSE FREQUENCY* for PEAK weld current when the *PULSE* is on.
PULSE FREQ.	This parameter sets the *PULSE FREQUENCY* when the *PULSE* is on.

200 Pi Table 4-3: Parameter Descriptions

Parameter	Description
DOWN SLOPE	This parameter operates in TIG modes only and is used to set the time for the weld current to ramp down, after the torch trigger switch has been pressed, to *CRATER CUR.* This control is used to eliminate the crater that can form at the completion of a weld.
CRATER CUR.	This parameter operates in *SLOPE* or *REPEAT* (4T) TIG modes only and is used to set the finish current for TIG. The CRATER Current remains on until the torch trigger switch is released after it has been depressed.
POST-FLOW	This parameter operates in TIG modes only and is used to adjust the post gas flow time once the arc has extinguished. This control is used to dramatically reduce oxidation of the tungsten electrode.
	The SAVE/LOAD buttons are used to save and retrieve a total number of 5 programs into the 200 Pi memory. NOTE: SAVE/LOAD button must remain depressed for 3 seconds in order to save or load the settings.

Table 4-3 (continued): Parameter Descriptions

4.04 Weld Parameters for Transtig 200 Pi

				Weld Mode		
Weld Parameter	Parameter Range	Factory Setting	Incremental Unit	STICK	HF TIG	LIFT TIG
PRE-FLOW	0.0 to 1.0 sec	0.1 sec	0.1 sec	No	Yes	Yes
HOT START	0 to 70A	20A	1A	Yes	Yes	No
INITIAL CUR.	1 to 200A	30A	1A	No	Yes	Yes
UP SLOPE	0 to 15 sec	1 sec	0.1 sec	No	Yes	Yes
PEAK CUR.	1 to 200A	120A	1A	No	Yes	Yes
WELD CUR	1 to 200A 230V	80A	1A	No	Yes	Yes
(TIG)	1 to 85A 115V	80A	1A	No	Yes	Yes
WELD CUR	1 to 160A 230V	80A	1A	Yes	No	No
(STICK)	1 to 85A 115V	80A	1A	Yes	No	No
SPOT TIME	0.5 to 5.0 sec	2 sec	0.1 sec	No	Yes	Yes
PULSE WIDTH	15 to 80%	50%	1%	No	Yes	Yes
PULSE FREQ.	0.5 to 500Hz	100.0Hz	See Table 4-5	No	Yes	Yes
DOWN SLOPE	0 to 25 sec	3 sec	0.1 sec	No	Yes	Yes
CRATER CUR.	1 to 200A	30A	1A	No	Yes	Yes
POST-FLOW	0.0 to 60 sec	10 sec	0.1 sec	No	Yes	Yes

Table 4-4: Weld Parameters for Transtig 200 Pi

PULSE FREQ. Range	Incremental Unit
0.5 to 20Hz	0.1Hz
20 to 100Hz	1Hz
100 to 500Hz	5Hz

Table 4-5: PULSE FREQ. Range and Incremental Units

4.05 Power Source Features

Feature	Description
New Digital Control	Almost all welding parameters are adjustable
Touch Panel Switches	Touch switches eliminate mechanical damage
Front Control Cover	Protects front panel controls
Digital Meter	Displays selected weld parameter value
	Displays weld current when welding
	Displays weld current for 20 seconds after weld has been completed
	A selected weld parameter value can be adjusted at any time even while welding
ON/OFF switch	Primary voltage Supply ON/OFF switch located on rear panel
Save/Load Function	A total number of 5 programs can be saved into the 200 Pi memory
	SAVE **the Current Weld Parameters into Memory**
	Press and hold the *SAVE* button for 3 seconds
	Select a memory location by rotating the control knob, 1 to 5 is displayed on the meter
	After selecting the desired memory location (ie 1 to 5), press the right scroll button and the machine will give a been to confirm the weld parameters from the control panel are saved.
	LOAD **(retrieve) a Program to Control Panel**
	Press and hold the *LOAD* button for 3 seconds
	Select a memory location by rotating the control knob, 1 to 5 is displayed on the meter
	After selecting the desired memory location (ie 1 to 5), press the right scroll button and the machine will give a been to confirm the weld parameters from the weld parameters are loaded.

Table 4-6: Power Source Features

Feature	Description
Voltage Reduction Device (VRD)	Reduces the OCV when the power supply is not in use. Eliminates the need for add on voltage reducers and has no effect on arc starting.
	VRD fully complies to AS 60974.1
	When Stick mode is selected the green VRD light is ON when not welding and red when welding.
	When in TIG modes VRD is off.
Control Knob	For the selected weld parameter, rotating the knob clockwise increases the parameter
	Rotating the knob counterclockwise decreases the parameter
	A selected weld parameter value can be adjusted at any time even while welding
	Pushing the knob in displays actual arc voltage.
Self Diagnosis Using Error Codes	An error code is displayed on the *Digital Meter* when a problem occurs with Primary supply voltage or internal component problems. Refer to troubleshooting guide.

Table 4-6 (continued): Power Source Features

4.06 Set-Up for SMAW (STICK) and GTAW (TIG)

Conventional operating procedures apply when using the Welding Power Source, i.e. connect work lead directly to work piece and electrode lead is used to hold electrode. Wide safety margins provided by the coil design ensure that the Welding Power Source will withstand short-term overload without adverse effects. The welding current range values should be used as a guide only. Current delivered to the arc is dependent on the welding arc voltage, and as welding arc voltage varies between different classes of electrodes, welding current at any one setting would vary according to the type of electrode in use. The operator should use the welding current range values as a guide, then finally adjust the current setting to suit the application.

WARNING

Before connecting the work clamp to the work and inserting the electrode in the electrode holder make sure the Primary power supply is switched off.

CAUTION

Remove any packaging material prior to use. Do not block the air vents at the front or rear or sides of the Welding Power Source.

CAUTION

DO NOT change the Weld Mode or Weld Process Mode until after POST-FLOW time has finished.

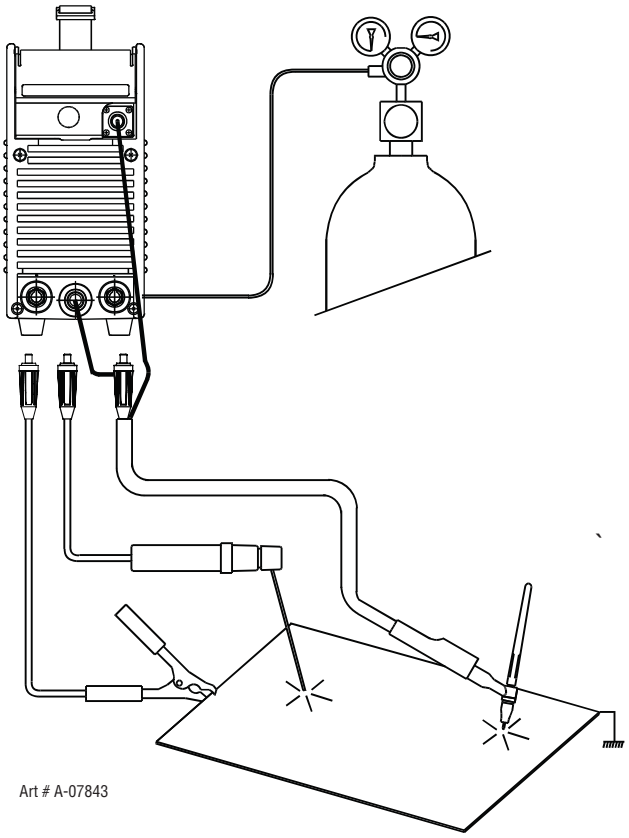


Figure 4-4: Transtig 200 Pi Set-Up

4.07 Sequence of Operation

NOTE

Scroll Buttons are used to select the parameters to be set. The LED's show which function is being adjusted on the weld sequence graph. Refer to Symbols Table located in the front of the manual for Symbol descriptions.

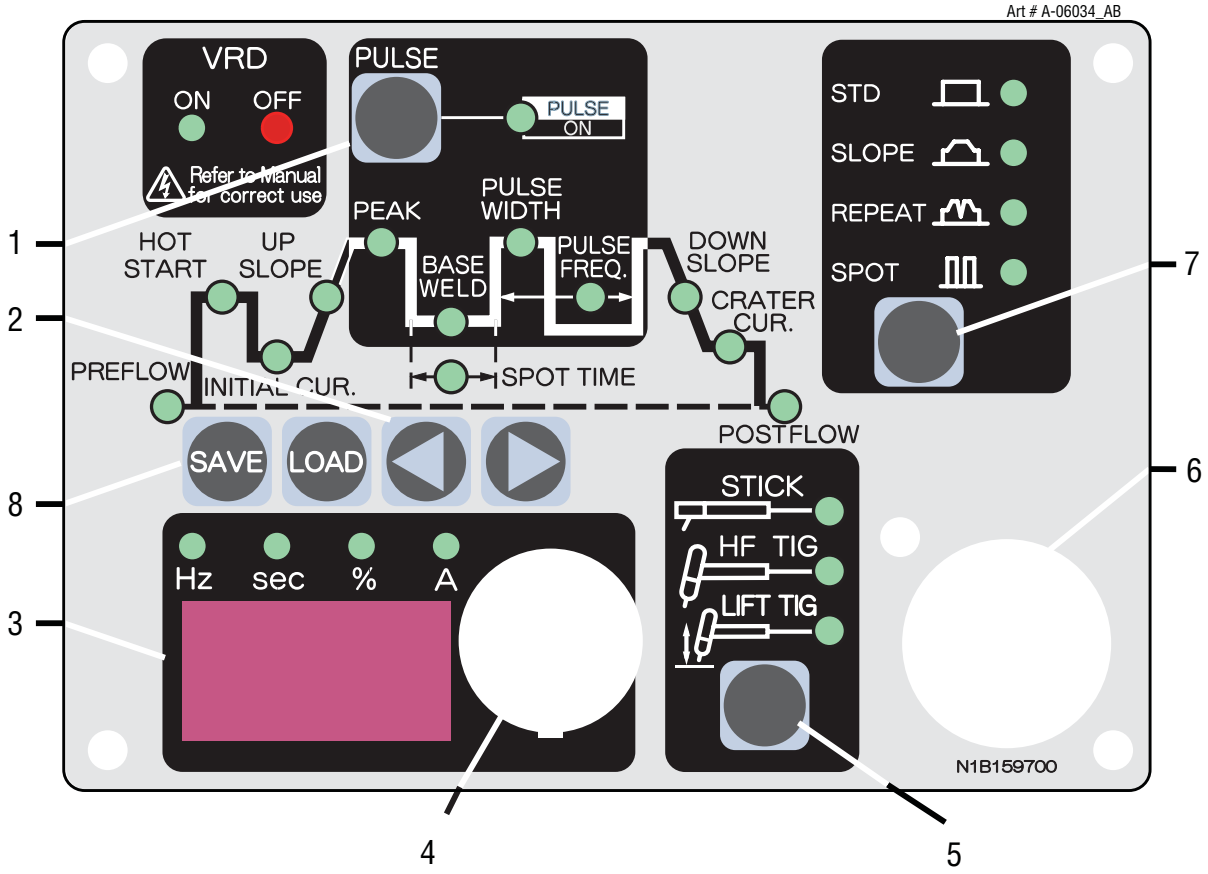


Figure 4-5: Transtig 200 Pi Front Panel

1. **Pulse Function:** Pressing this button enables the TIG current pulse functions.
2. **Scroll Buttons:** used to select the parameter to be set. The LED's show which function is being adjusted on the weld sequence graph.
3. **Digital LED Display:** Welding amperage and parameter values are displayed in this window. Internal warnings such as over temperature, low or high input voltage applied are signaled to the operator by a warning sound and error message on the screen.
4. **Control Knob:** allows the operator to adjust the output amperage within the entire range of the power source, also used to set each parameter value. Pushing the knob inward displays the actual welding voltage.
5. **Process Button:** This button selects between STICK, Lift or HF TIG mode.
6. **8 Pin Remote Control Receptacle:** for connecting remote device.
7. **TIG Mode Functions:** Pressing this button scrolls through the output TIG function modes (Standard, Slope, Slope w/repeat, Spot).
8. **Save/Load Button:** by using the Save & Load buttons the operator can easily save up to 5 welding parameter program. NOTE: SAVE/LOAD button must remain depressed for 3 seconds in order to save or load the settings.

4.08 Stick Welding

- Connect work lead to negative terminal
- Connect electrode lead to positive terminal
- Switch machine on
- Set weld current
- Connect remote control device if required

Use the Scroll Buttons to move to the parameter to be set. The LED will show which function is being adjusted on the weld sequence graph. Use the control knob to adjust each parameter.

- Set *HOT START*
- Set *WELD* current

Commence welding

4.09 HF TIG & Lift TIG Welding

- Connect work lead to positive terminal
- Connect TIG torch to negative terminal
- Switch machine on
- Set *WELD* current.
- Connect remote control device. A remote control device is required for use during LIFT TIG and HF TIG operation. See section 3.01, section 2 "*Remote Control Socket*", for complete details of the remote device.

Use the Scroll Buttons to move to the parameter to be set. The LED will show which function is being adjusted on the weld sequence graph. Use the control knob to adjust each parameter.

- Set *PRE-FLOW* time
- Set *HOT START* current
- Set *POST-FLOW* time
- Set *WELD* current
- Set *POST-FLOW* time

Slope Mode Parameters if required

- Set *INTIAL CUR* current
- Set *UP SLOPE* time
- Set (WELD) *PEAK CUR* current
- Set *BASE* current
- Set *DOWN SLOPE* time
- Set *CRATER CUR* current

Pulse Mode parameters if required

- Set *PULSE WIDTH* % for *PEAK CURRENT*
- *Set PEAK CURRENT*
- Set *PULSE FREQ*

Commence welding

4.10 Slope Mode Sequence

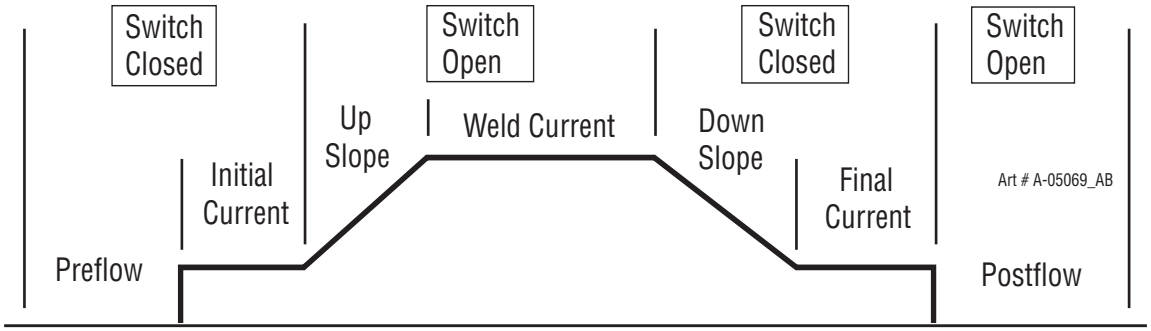


Figure 4-6: Slope Mode Sequence

1) To start Slope sequence Close remote switch contacts. Once the welding arc is established the Power Source will maintain initial current setting as long as the remote switch contacts are closed.
   a) In the HF TIG mode, after Preflow time High Frequency is present at the torch. When the torch is positioned close to the work the welding current will transfer to the work and establish the arc at the initial current setting.
   b) In the Lift TIG mode, after Preflow time Lift Start current is present at the torch. When the electrode is touched to the work and lifted off, the welding arc is established at the initial current setting.
2) Open Remote Switch: current increases to weld current. Once welding arc has reached weld current the power source will maintain weld current as long as the remote switch contacts are open.
3) Close Remote Switch: Welding current decreases to final current setting. Once final welding current is reached the power source will maintain final current setting as long as the remote switch contacts are closed.
4) Open Remote Switch: Welding arc stops and post flow begins.

4.11 Slope Mode with Repeat Sequence

The repeat function is operated during the down slope cycle of the Slope Sequence and is active through the down slope period only. During the down slope period by opening the Remote Switch contacts the current will increase back to weld current. Within the Down Slope period the repeat function can operated as many times as desired. To continue slope cycle and end slope sequence close remote switch contacts and allow weld current to reach final current setting. Once final current setting is reached opening the Remote Switch again will turn off the welding arc and post flow begins.

4.12 Pulse Controls

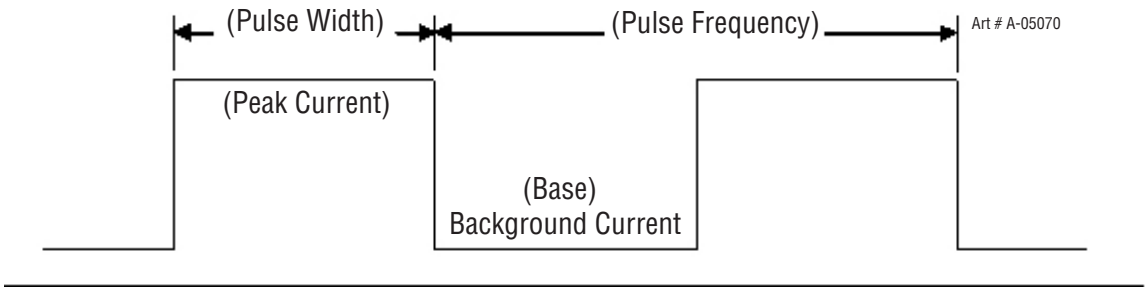


Figure 4-7: Pulse Controls

The Pulse controls are used primarily to control heat input. Pulse offers a number of advantages as follows:

1) Control puddle: size and fluidity (especially out of position).
2) Increase penetration
3) Travel speed control
4) Better consistent quality
5) Distortion on lighter or thinner materials.

Pulse-current provides a system in which the welding current continuously changes between two levels. During the periods of Peak current heating and fusion takes place and during the background (base) current periods, cooling and solidification take place. Pulse Width is the time in one cycle the current stays at the peak current setting. Pulse Frequency measured in Hertz is the number of cycles per second the current travels between peak and background current settings. It is as if the foot rheostat were moved up and down to increase and decrease the welding current on a regular basis. The faster you moved the foot rheostat up and down the faster the frequency.

4.13 Basic TIG Welding Guide

1. Electrode Polarity:

Connect the TIG torch to the - / *TORCH* terminal and the work lead to the *+ / WORK* terminal for direct current straight polarity. Direct current straight polarity is the most widely used polarity for DC TIG welding. It allows limited wear of the electrode since 70% of the heat is concentrated at the work piece.

2. Tungsten Electrode Current Ranges:

Electrode Diameter	DC Current (Amps)
0.040” (1.0mm)	30 – 60
1/16” (1.6mm)	60 – 115
3/32” (2.4mm)	100 – 165
1/8” (3.2mm)	135 – 200
5/32” (4.0mm)	190 – 280
3/16” (4.8mm)	250 – 340

Table 4-7: Current Ranges for Various Tungsten Electrode Sizes

3. Tungsten Electrode Types:

Electrode Type (Ground Finish)	Welding Application	Features	Color Code
Thoriated 2%	DC welding of mild steel, stainless steel and copper.	Excellent arc starting, Long life, High current carrying capacity.	Red
Ceriated 2%	DC welding of mild steel, stainless steel, copper, aluminium, magnesium and their alloys	Longer life, More stable arc, Easier starting, Wider current range, Narrower more concentrated arc.	Grey

Table 4-8: Tungsten Electrode Types

4. Guide for Selecting Filler Wire Diameter:

Filler Wire Diameter	DC Current Range (Amps)
1/16” (1.6 mm)	20 - 90
3/32” (2.4 mm)	65 - 115
1/8” (3.2 mm)	100 - 165
3/16” (4.8 mm)	200-350

Table 4-9: Filler Wire Selection Guide

NOTE

The filler wire diameter specified in Table 4-9 is a guide only, other diameter wires may be used according to the welding application.

5. Shielding Gas Selection:

Alloy	Shielding Gas
Aluminium & alloys	Argon
Carbon Steel	Argon
Stainless Steel	Argon
Copper	Argon

Table 4-10: Shielding Gas Selection

6. TIG Welding Parameters for Low Carbon & Low Alloy Steel Pipe:

Electrode Type & Diameter	Current Range DC Amperes	Fillet Rod for Root Pass	Joint Preparation
Thoriated 2% 3/32'' (2.4mm)	120-170	Yes	
Thoriated 2% 3/32'' (2.4mm)	100-160	Yes	
Thoriated 2% 3/32'' (2.4mm)	90-130	No	

Table 4-11: TIG Welding Parameters for Low Carbon & Low Alloy Steel Pipe

Base Metal Thickness	DC Current for Mild Steel	DC Current for Stainless Steel	Tungsten Electrode Diameter	Filler Rod Diameter (if required)	Argon Gas Flow Rate Liters/min	Joint Type
0.040” 1.0mm	35-45 40-50	20-30 25-35	0.040” 1.0mm	1/16” 1.6mm	5-7	Butt/Corner Lap/ Fillet
0.045” 1.2mm	45-55 50-60	30-45 35-50	0.040” 1.0mm	1/16” 1.6mm	5-7	Butt/Corner Lap/ Fillet
1/16” 1.6mm	60-70 70-90	40-60 50-70	1/16” 1.6mm	1/16” 1.6mm	7	Butt/Corner Lap/ Fillet
1/8” 3.2mm	80-100 90-115	65-85 90-110	1/16” 1.6mm	3/32” 2.4mm	7	Butt/Corner Lap/ Fillet
3/16” 4.8mm	115-135 140-165	100-125 125-150	3/32” 2.4mm	1/8” 3.2mm	10	Butt/Corner Lap/ Fillet
¼” 6.4mm	160-175 170-200	135-160 160-180	1/8” 3.2mm	5/32” 4.0mm	10	Butt/Corner Lap/ Fillet

Table 4-12: DC TIG Welding Parameters

NOTE

The information outlined above is for general guidance only. Specific parameters should be used according to the welding application

4.14 Basic Arc Welding Guide

1. Electrode Polarity:

Stick electrodes are generally connected to the '+' terminal and the work lead to the '-' terminal but if in doubt consult the electrode manufacturers literature.

2. Effects of Stick Welding Various Materials:

A. High tensile and alloy steels

The two most prominent effects of welding these steels are the formation of a hardened zone in the weld area, and, if suitable precautions are not taken, the occurrence in this zone of under-bead cracks. Hardened zone and under-bead cracks in the weld area may be reduced by using the correct electrodes, preheating, using higher current settings, using larger electrodes sizes, short runs for larger electrode deposits or tempering in a furnace.

B. Manganese steels

The effect on manganese steel of slow cooling from high temperatures is to embrittle it. For this reason it is absolutely essential to keep manganese steel cool during welding by quenching after each weld or skip welding to distribute the heat.

C. Cast Iron

Most types of cast iron, except white iron, are weldable. White iron, because of its extreme brittleness, generally cracks when attempts are made to weld it. Trouble may also be experienced when welding white-heart malleable, due to the porosity caused by gas held in this type of iron.

D. Copper and alloys

The most important factor is the high rate of heat conductivity of copper, making preheating of heavy sections necessary to give proper fusion of weld and base metal.

E. Types of Electrodes

Arc Welding electrodes are classified into a number of groups depending on their applications. There are a great number of electrodes used for specialized industrial purposes which are not of particular interest for everyday general work. These include some low hydrogen types for high tensile steel, cellulose types for welding large diameter pipes, etc. The range of electrodes dealt with in this publication will cover the vast majority of applications likely to be encountered; are all easy to use and all will work on even the most basic of welding machines.

Metals being joined	Electrode	Comments
Mild steel	6013	Ideal electrodes for all general purpose work. Features include out standing operator appeal, easy arc starting and low spatter.
Mild steel	7014	All positional electrode for use on mild and galvanized steel furniture, plates, fences, gates, pipes and tanks etc. Especially suitable for vertical-down welding.
Cast iron	99% Nickel	Suitable for joining all cast irons except white cast iron.
Stainless steel	318L-16	High corrosion resistance. Ideal for dairy work, etc. On stainless steels.
Copper, Bronze, Brass, etc.	Bronze 5.7 ERCUSI-A	Easy to use electrode for marine fittings, water taps and valves, water trough float arms, etc. Also for joining copper to steel and for bronze overlays on steel shafts.
High Alloy Steels, Dissimilar Metals, Crack Resistance. All Hard-To-Weld Jobs.	312-16	It will weld most problematical jobs such as springs, shafts, broken joins mild steel to stainless and alloy steels. Not suitable for Aluminum.

Table 4-13: Types of Electrodes

SECTION 5: SERVICE

5.01 Routine Maintenance

The only routine maintenance required for the power supply is a thorough cleaning and inspection, with the frequency depending on the usage and the operating environment.

WARNING

Disconnect primary power at the source before opening the enclosure. Wait at least two minutes before opening the enclosure to allow the primary capacitors to discharge.

To clean the unit, open the enclosure and use a vacuum cleaner to remove any accumulated dirt and dust. The unit should also be wiped clean, if necessary; with solvents that are recommended for cleaning electrical apparatus.

CAUTION

Do not blow air into the power supply during cleaning. Blowing air into the unit can cause metal particles to interfere with sensitive electrical components and cause damage to the unit.

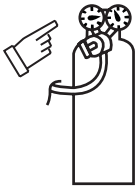
5.02 Maintenance Diagram

Warning!
Disconnect input power before maintaining.

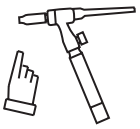
Maintain more often if used under severe conditions

Each Use

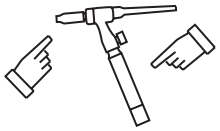
Visual check of regulator and pressure



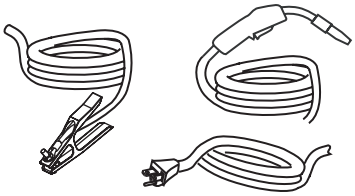
Visual check of torch Consumable parts



Weekly



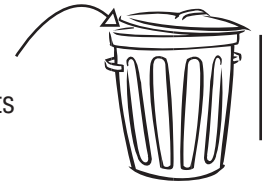
Visually inspect the torch body and consumables



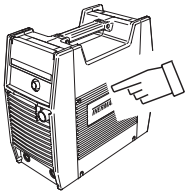
Visually inspect the cables and leads. Replace as needed

3 Months

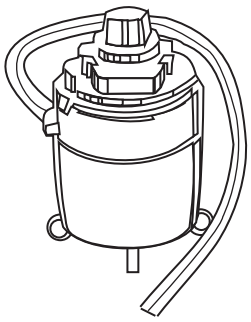
Replace all broken parts



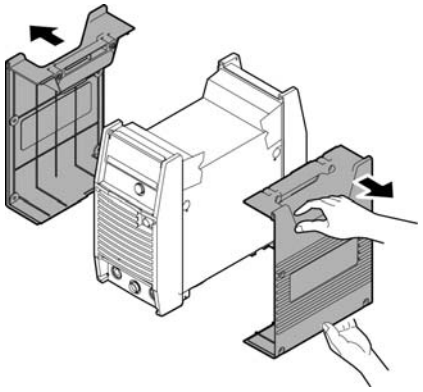
Clean exterior of power supply



6 Months



Bring the unit to an authorized CIGWELD Service Provider to remove any accumulated dirt and dust from the interior. This may need to be done more frequently under exceptionally dirty conditions.



Art # A-07681_AC

5.03 Basic Troubleshooting

WARNING

There are extremely dangerous voltages and power levels present inside this product. Do not attempt to open or repair unless you are an Accredited Cigweld Service Provider and you have had training in power measurements and troubleshooting techniques.

If major complex subassemblies are faulty, then the Welding Power Source must be returned to an Accredited Cigweld Service Provider for repair.

The basic level of troubleshooting is that which can be performed without special equipment or knowledge.

5.04 TIG Welding Problems

Weld quality is dependent on the selection of the correct consumables, maintenance of equipment and proper welding technique.

Description	Possible Cause	Remedy
1 Excessive bead build-up or poor penetration or poor fusion at edges of weld	Welding current is too low	Increase weld current and/or faulty joint preparation
2 Weld bead too wide and flat or undercut at edges of weld or excessive burn through	Welding current is too high	Decrease weld current
3 Weld bead too small or insufficient penetration or ripples in bead are widely spaced apart	Travel speed too fast	Reduce travel speed
4 Weld bead too wide or excessive bead build-up or excessive penetration in butt joint	Travel speed too slow	Increase travel speed
5 Uneven leg length in fillet joint	Wrong placement of filler rod	Re-position filler rod
6 Electrode melts when arc is struck	Electrode is connected to the '+' terminal	Connect the electrode to the '-' terminal
7 Dirty weld pool	A Electrode contaminated through contact with work piece or filler rod material B Gas contaminated with air	A Clean the electrode by grinding off the contaminates B Check gas lines for cuts and loose fitting or change gas cylinder
8 Electrode melts or oxidizes when an arc is struck	A No gas flowing to welding region B Torch is clogged with dust C Gas hose is cut D Gas passage contains impurities E Gas regulator turned off F Torch valve is turned off G The electrode is too small for the welding current	A Check the gas lines for kinks or breaks and gas cylinder contents B Clean torch C Replace gas hose D Disconnect gas hose from torch then raise gas pressure and blow out impurities E Turn on F Turn on G Increase electrode diameter or reduce the welding current
9 Poor weld finish	Inadequate shielding gas	Increase gas flow or check gas line for gas flow problems

Table 5-1: TIG Welding Problems

Description	Possible Cause	Remedy
10 Arc flutters during TIG welding	A Tungsten electrode is too large for the welding current	A Select the right size electrode. Refer to Basic TIG Welding Guide
	B Absence of oxides in the weld pool	B Refer to Basic TIG Welding Guide for ways to reduce arc flutter
11 Welding arc cannot be established	A Work clamp is not connected to the work piece or the work/torch leads are not connected to the right terminals	A Connect the work clamp to the work piece or connect the work/torch leads to the right welding terminals
	B Torch lead is disconnected	B Connect it to the '-' terminal
	C Gas flow incorrectly set, cylinder empty or the torch valve is off	C Select the right flow rate, change cylinders or turn torch valve on
12 Arc start is not smooth	A Tungsten electrode is too large for the welding current	A Select the right size electrode. Refer to Basic TIG Welding Guide
	B The wrong electrode is being used for the welding job	B Select the right size electrode. Refer to Basic TIG Welding Guide
	C Gas flow rate is too high	C Select the correct rate for the welding job. Refer to Basic TIG Welding Guide
	D Incorrect shielding gas is being used	D Select the right shielding gas. Refer to Basic TIG Welding Guide
	E Poor work clamp connection to work piece	E Improve connection to work piece

Table 5-1 (continued): TIG Welding Problems

5.05 Stick Welding Problems

Description	Possible Cause	Remedy
1 Gas pockets or voids in weld metal (Porosity)	A Electrodes are damp	A Dry electrodes before use
	B Welding current is too high	B Reduce welding current
	C Surface impurities such as oil, grease, paint, etc	C Clean joint before welding
2 Crack occurring in weld metal soon after solidification commences	A Rigidity of joint	A Redesign to relieve weld joint of severe stresses or use crack resistance electrodes
	B Insufficient throat thickness	B Travel slightly slower to alloy greater build-up in throat
	C Cooling rate is too high	C Preheat plate and cool slowly
3 A gap is left by failure of the weld metal to fill the root of the weld	A Welding current is too low	A Increase welding current
	B Electrode too large for joint	B Use smaller diameter electrode
	C Insufficient gap	C Allow wider gap
	D Incorrect sequence	D Use correct build-up sequence

Table 5-2: STICK Welding Problems

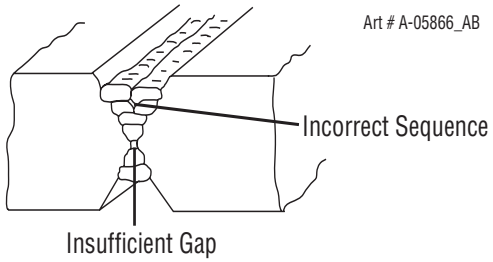


Figure 5-1: Example of Insufficient Gap or Incorrect Sequence

Description	Possible Cause	Remedy
4 Portions of the weld run do not fuse to the surface of the metal or edge of the joint	A Small electrodes used on heavy cold plate	A Use larger electrodes and preheat the plate
	B Welding current is too low	B Increase welding current
	C Wrong electrode angle	C Adjust angle so the welding arc is directed more into the base metal
	D Travel speed of electrode is too high	D Reduce travel speed of electrode
	E Scale or dirt on joint surface	E Clean surface before welding

Table 5-2 (continued): STICK Welding Problems

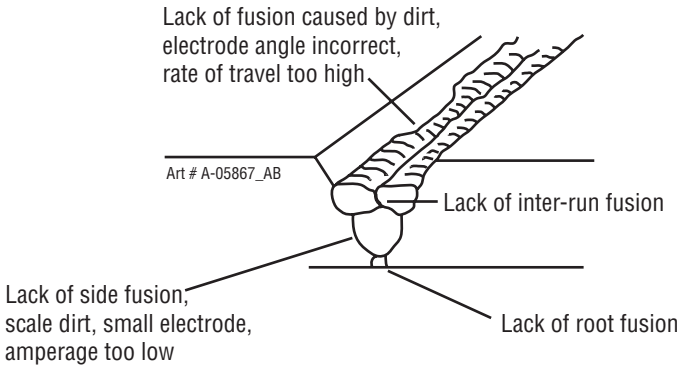


Figure 5-2: Example of Lack of Fusion

Description	Possible Cause	Remedy
5 Non-metallic particles are trapped in the weld metal (slag inclusion)	A Non-metallic particles may be trapped in undercut from previous run	A If bad undercut is present, clean slag out and cover with a run from a smaller diameter electrode
	B Joint preparation too restricted	B Allow for adequate penetration and room for cleaning out the slag
	C Irregular deposits allow slag to be trapped	C If very bad, chip or grind out irregularities
	D Lack of penetration with slag trapped beneath weld bead	D Use smaller electrode with sufficient current to give adequate penetration. Use suitable tools to remove all slag from corners
	E Rust or mill scale is preventing full fusion	E Clean joint before welding
	F Wrong electrode for position in which welding is done	F Use electrodes designed for position in which welding is done, otherwise proper control of slag is difficult

Table 5-2 (continued): STICK Welding Problems

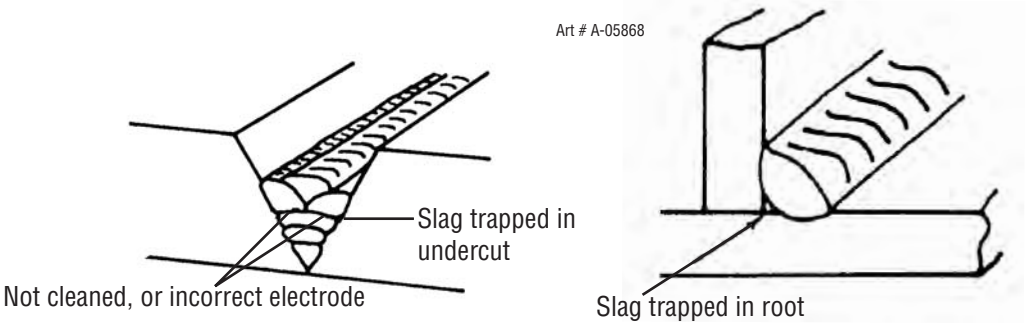


Figure 5-3: Examples of Slag Inclusion

5.06 Power Source Problems

Description	Possible Cause	Remedy
1 The welding arc cannot be established	A The Primary supply voltage has not been switched ON B The Welding Power Source switch is switched OFF C Loose connections internally	A Switch ON the Primary supply voltage B Switch ON the Welding Power Source C Have an Accredited Cigweld Service Provider repair the connection
2 Maximum output welding current cannot be achieved with nominal Mains supply voltage	Defective control circuit	Have an Accredited Cigweld Service Provider inspect then repair the welder
3 Welding current reduces when welding	Poor work lead connection to the work piece	Ensure that the work lead has a positive electrical connection to the work piece
4 No gas flow when the torch trigger switch is depressed	A Gas hose is cut B Gas passage contains impurities C Gas regulator turned off	A Replace gas hose B Disconnect gas hose from the rear of Power Source then raise gas pressure and blow out impurities C Turn gas regulator on

Table 5-3: Power Source Problems

Description	Possible Cause	Remedy
5 Gas flow won't shut off	A Weld Mode (*STD, SLOPE, REPEAT or SPOT*) was changed before *POST-FLOW* gas time had finished	A Strike an arc to complete the weld cycle OR switch machine off then on to reset solenoid valve sequence
	B Gas valve is faulty	B Have an Accredited Cigweld Service Provider replace gas valve
	C Gas valve jammed open	C Have an Accredited Cigweld Service Provider repair or replace gas valve
	D *POST-FLOW* control is set to 60 sec.	D Reduce *POST-FLOW* time
6 The TIG electrode has been contaminated due to the gas flow shutting off before the programmed *POST-FLOW* time has elapsed	The Weld Process Mode (*STICK, HF TIG or LIFT TIG*) was changed before POST-FLOW gas time had finished	Do not change Weld Process Mode before the *POST-FLOW* gas time had finished

Table 5-3 (continued): Power Source Problems

5.07 Power Source Error Codes

Description	Possible Cause	Remedy	Remarks
1 E01 error code displayed. Temperature sensor TH1 (protects IGBTs) is greater than 80°C for about 1 second	A The Welding Power Source's duty cycle has been exceeded B Fan ceases to operate C Air flow is restricted by vents being blocked	A Let Power Source cool down then keep within its duty cycle B Have an Accredited Cigweld Service Provider investigate C Unblock vents then let Power Source cool down	Weld current ceases. Buzzer sounds constantly. E01 resets when TH1 decreases to 70°C for about 30 seconds
2 E02 error code displayed. Temperature sensor TH2 (protects IGBTs) is greater than 90°C for about 1 second	A The Welding Power Source's duty cycle has been exceeded B Fan ceases to operate C Air flow is restricted by vents being blocked	A Let Power Source cool down then keep within its duty cycle B Have an Accredited Cigweld Service Provider investigate C Unblock vents then let Power Source cool down	Weld current ceases. Buzzer sounds constantly. E02 resets when TH2 decreases to 70°C for about 30 seconds
3 E03 error code displayed. Primary (input) current too high	A Primary current too high because welding arc is too long B Mains supply voltage is more than 10% below nominal voltage	A Reduce length of welding arc B Have an Accredited Cigweld Service Provider or a qualified electrician check for low Mains voltage	Weld current ceases. Buzzer sounds constantly. Switch machine off then on to reset E03 error
4 E04 error code displayed Output voltage exceeds the secondary voltage specification.	TIG torch cable and/or work lead are too long or leads are coiled.	Reduce the length of the TIG torch cable and/or work lead or un-coiled leads.	Weld current ceases. Buzzer sounds constantly. Switch machine OFF then ON to reset E04 error.
5 E93 error code displayed. Memory chip (EEPROM) on control PCB cannot read/write weld parameters	Memory chip (EEPROM) error	Have an Accredited Cigweld Service Provider check the control PCB	Weld current ceases. Buzzer sounds constantly. Switch machine off

Table 5-4: Power Source Error Codes

Description	Possible Cause	Remedy	Remarks
6 E94 error code displayed. Temperature sensor TH1 for IGBTs is an open circuit	The Welding Power Source's temperature sensors have malfunctioned	Have an Accredited Cigweld Service Provider check or replace the temperature sensors	Weld current ceases. Buzzer sounds constantly. Switch machine off.
7 E99 error code displayed. Mains supply (input) voltage has been turned off, but control circuit has power from the primary	A Main on/off switch on machine has been turned off B Mains supply (input) voltage has been turned off	A Turn on/off switch on B Have an Accredited Cigweld Service Provider or a qualified electrician check the Main voltage and fuses	Weld current ceases. Buzzer sounds constantly. Must switch machine off then on to reset E99 error

Table 5-4 (continued): Power Source Error Codes

5.08 Voltage Reduction Device (VRD)

1. VRD Specification:

Description	Transtig 200 Pi	Notes
VRD Open Circuit Voltage	15.3 to 19.8V	Open circuit voltage between welding terminals
VRD Resistance	148 to 193 ohms	The required resistance between welding terminals to turn ON the welding power
VRD Turn OFF Time	0.2 to 0.3 seconds	The time taken to turn OFF the welding power once the welding current has stopped

Table 5-5: VRD Specification

2. VRD Maintenance:

Routine inspection and testing (power source):

An inspection of the power source, an insulation resistance test and an earth resistance test shall be carried out.

a) For transportable equipment, at least once every 3 months; and

b) For fixed equipment, at least once every 12 months.

The owners of the equipment shall keep a suitable record of the periodic tests.

NOTE

A transportable power source is any equipment that is not permanently connected and fixed in the position in which it is operated.

In addition to the above tests and specifically in relation to the VRD fitted to this machine, the following periodic tests should also be conducted by an accredited Cigweld Service Provider.

Description	Required Parameters
VRD Open Circuit Voltage	Less than 20V; at Vin=240V
VRD Turn ON Resistance	Less than 200 ohms
VRD Turn OFF Time	Less than 0.3 seconds

Table 5-6: Periodic Tests

If this equipment is used in a hazardous location or environments with a high risk of electrocution then the above tests should be carried out prior to entering this location.

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6 ADVANCED TROUBLESHOOTING

If you are here, all of the troubleshooting suggestions in Section 5 - Basic Troubleshooting have either failed to resolve the faulty operation or have indicated that one or more of the subsystems within the power supply are defective. This section provides the information needed to take live measurements on the various subsystems within the power supply, and replace those subsystems that prove faulty.

CAUTION

Troubleshooting and repairing this unit is a process, which should be undertaken only by those familiar with high voltage/high power electronic equipment.

WARNING

There are extremely dangerous voltage and power levels present inside this unit. Do not attempt to diagnose or repair unless you have training in power electronics, measurement and troubleshooting techniques.

Under no circumstances are field repairs to be attempted on printed circuit boards or other subassemblies of this unit. Evidence of unauthorized repairs will void the factory warranty. If a subassembly is found to be defective by executing any of the procedures in this Service Manual, the subassembly should be replaced with a new one. The faulty subassembly should then be returned to Thermal Arc through established procedures.

WARNING

Disconnect primary power at the source before disassembling the power supply. Frequently review the "Important Safety Precautions" in section 1.02. Be sure the operator is equipped with proper gloves, clothing and eye and ear protection. Make sure no part of the operator's body comes into contact with the work piece or any internal components while the unit is activated.

6.1 System-Level Fault Isolation

If none of the suggestions provided in Section 8 have solved the problem or corrected the faulty operation, the next step is to isolate one or more of the internal subassemblies that may be defective.

CAUTION

Perform all steps in each procedure, in sequence. Skipping portions of procedures, or performing steps out of sequence can result in damage to the unit, and possible injury, or worse, to the operator.

6.1.1 Opening the Enclosure

1) Verify that the switch of power supply and the switch on switchboard (distribution panel) are all OFF.

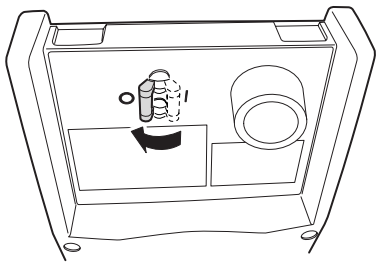


Figure 6-1: Switch OFF

CAUTION

The capacitors inside the power supply will slowly discharged after you turn off the switch of the power supply or the switch at the breaker box (distribution panel). Wait at least 5 minutes for the discharge to complete.

2) Remove all screws and nuts on the side panels.

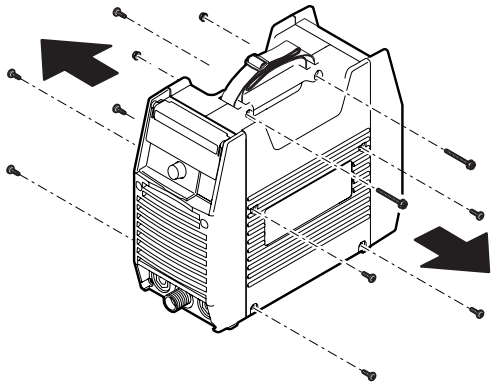


Figure 6-2: Remove screws

3) Loosen the screws on the front panel and the rear panel by turning them approximately two turns CCW.

NOTE

DO NOT remove the screws completely.

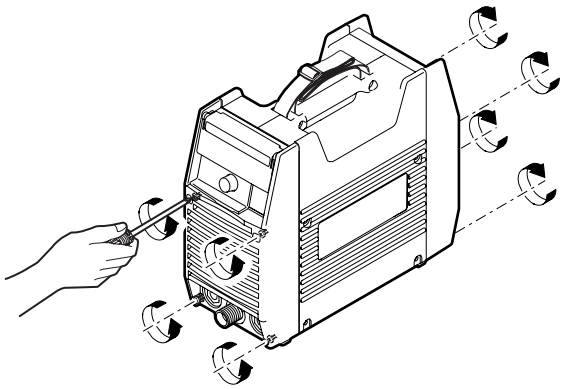


Figure 6-3: Loosen screws

4) Pull the front panel slightly forward and pull the rear panel slightly backward.

The interlocking hooks of the side case covers can now be disengaged from the front and rear panels.

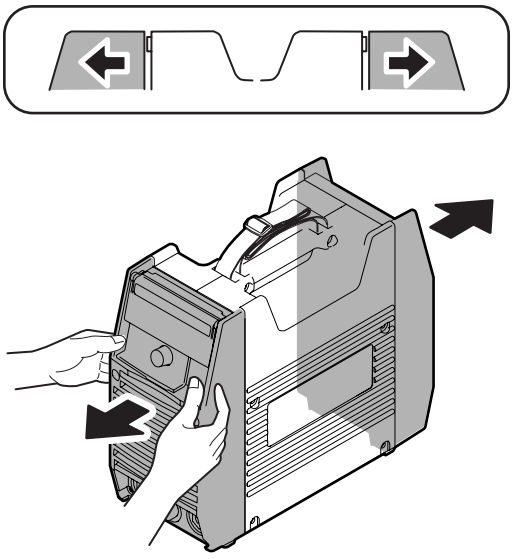


Figure 6-4: Loosen front and rear panels

5) Remove the side panels.

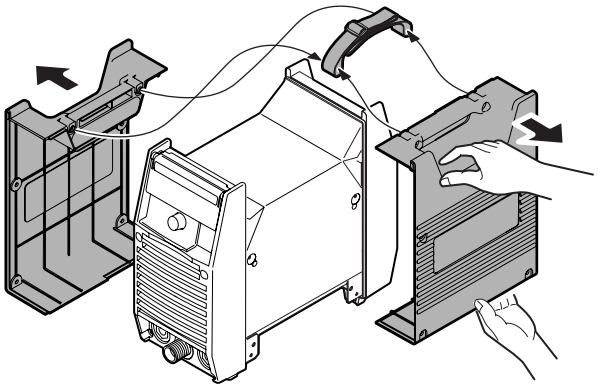


Figure 6-5: Remove Side Panel

6) Remove protection cover sheet by removing the plastic tabs.

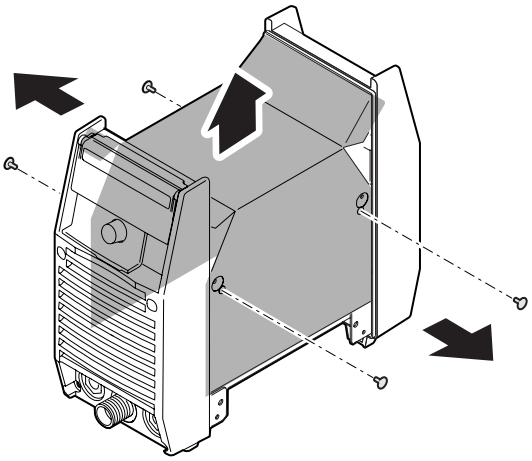


Figure 6-6: Remove PCB cover

NOTE

When you re-assemble the parts, conduct the above process backwards.

6.2 Verification and Remedy to the Indicated Error Codes

NOTE

The capacitors inside the power supply will slowly discharged after you turn off the switch of the power supply or the switch at the breaker box (distribution panel). Wait at least 5 minutes for the discharge to complete and then remove the cases to continue your inspection and repair (or maintenance) inside the power supply. As for the removal and installation of the case, Refer to section 6.1-1.

NOTE

During the "Verification/Remedy" procedures below, follow the alphabetical sequence (a, b, c...) and proceed with your verification and confirmation.

NOTE

After you Verify and replace all spare parts and components, verify that there are no damaged harnesses or connectors, uninstalled or loose screws.

6.2.1 E01 “Over-Temperature at the primary side”

Cause

Occurs when an over-temperature condition of the primary IGBT is detected.

Verification/Remedy

a) Unit may be in thermal shutdown mode.
- Review the rated duty cycle of the unit per section 3.8. Exceeding the duty cycle can damage the unit and void the warranty. Refer also to section 1.6 for additional information.

b) Verify the ventilating condition.
- Maintain a clear and unobstructed distance of more than 30cm in the front and more that 50cm in the rear of the unit for ventilation purposes.
- Verify and maintain clean, dust free, front and rear airflow paths. Cleaning and removing dust from the front and rear panels once every six months in a normal working environment is recommended. Extremely dusty environments will require more frequent cleanings.

c) Verify the operation of the cooling fan, FAN1, and replace it if necessary.
- Verify the condition of FAN1. Verify that there are no broken or cracked fan blades and that FAN1 is not producing any abnormal sounds.
- If broken or cracked FAN1 blades, or abnormal sounds are emanating from FAN1, replace FAN1.
- Refer to section7.3-11 for additional FAN1 tests.
- Refer to section 6.5-3 for the replacement of FAN1.

d) Replace PCB4 (WK-5449) and PCB5 (WK-5448).
- Refer to section 7.3-4, 3-5 for the replacement of PCB4 and PCB5.

6.2.2 E02 “Over-Temperature at the secondary side”

Cause

Occurs when an over-temperature condition of the secondary IGBT and diode are detected.

Verification/Remedy

a) Unit may be in thermal shutdown mode.
- Review the rated duty cycle of the unit per section Chapter 3.8. Exceeding the duty cycle can damage the unit and void the warranty.

b) Verify the ventilating condition.
- Maintain a clear and unobstructed distance of more than 30cm in the front and more that 50cm in the rear of the unit for ventilation purposes.
- Verify and maintain clean, dust free, front and rear airflow paths. Cleaning and removing dust from the front and rear panels once every six months in a normal working environment is recommended. Extremely dusty environments will require more frequent cleanings.

c) Verify the operation of the cooling fan, FAN1, and replace it if necessary.
- Verify the condition of FAN1. Verify that there are no broken or cracked fan blades and that FAN1 is not producing any abnormal sounds.
- If broken or cracked FAN1 blades or abnormal sounds are emanating from FAN1, replace FAN1.
- Verify the operation of the cooling fan and replace it if the condition of FAN1 is inactive. Follow the instruction in section.
- Refer to section 6.5-3 for additional FAN1 tests.
- Refer to section 7.3-11 for the replacement of FAN1.

d) Replace PCB4 (WK-5449) and PCB5 (WK-5448).
- Refer to section 7.3-4, 3-5 for the replacement of PCB4 and PCB5.

6.2.3 E03 "Primary Over-Current Failure"

Cause

Occurs when excessive current is detected flowing into the primary side of the main transformer.

Verification/Remedy

a) Confirm the operation of the machine within the rated specification.
- Refer to the specification data sheet in section 3.9.

b) Verify the secondary diode (D2 and D3).
- Refer to section 6.5-6 for the test of D2 and D3.
- Refer to section 7.3-8 for the replacement of D2 and D3.

c) Verify the H.F. unit (HF. UNIT1).
- Refer to section 7.3-12 for the replacement of HF.UNIT 1.

d) Replace the Hall CT (CT1).

NOTE

Pay special attention to installed direction of CT1. The Hall CT will not function properly if installed in the incorrect direction.

- Refer to section 12.3-10 for the replacement of CT1.

6.2.4 E94 "Thermistor malfunction"

Cause

Thermistors for detecting temperature of internal components have malfunctioned.

Verification/Remedy

a) Verify a secure connection of the harness wired between CN5-6 on PCB1 (WK-5713) and Thermistors (TH1, TH2).
- Re-install the harness with a secure connection.
- Contact the manufacturer if you find any broken connectors or damaged wiring harness.

b) Replace thermistors (TH1, TH2).
- Refer to section 12.3-12, 3-13.

c) Replace PCB5 (WK-5448).
- Refer to section 12.3-5.

6.2.5 E99 "Initial Power Receiving"

Cause

Occurs when the initial AC power received signal has not reached the CPU. This error occurs normally during the power "OFF" sequence of the unit.

Verification/Remedy

a) Verify the connection between "+" terminal of Primary diode (D1) and PCB1 (WK-5713).
- Verify that there is no omission of a loosening connected wire between the PCB1 and D1.
- Contact the manufacturer if you find any broken connectors or damaged wire.

b) Verify that there is no omission of a loosening screws and connected harness with PCB1 (WK-5713).
- Re-install the harness with a secure connection.
- Contact the manufacturer if you find any broken connectors or damaged wiring harness.
- Replace PCB1. Refer to section 7.3-1.

c) Replace PCB4 (WK-5449) and PCB5 (WK-5448).
- Refer to section 7.3-4, 3-5 for the replacement of PCB4 and PCB5.

6.2.6 E04 "Torch Cable Failure"

Cause

The combined length of the torch cable and the work cable is too long.

Verification/Remedy

a) Verify the rated duty cycle of the torch/work cable and the power supply.
- Only use appropriate sized torch cables (length and capacity). The recommended total combined length of the torch and work cable is 50 feet.
- Torch and work cable should not be "coiled" during welding operations.
- Maintain the duty cycle of the power supply. Refer to section 3.8 for the recommended duty cycle.

b) Replace PCB6 (WK-5549)
- Refer to section 12.3.6 for the replacement of PCB6.

6.2.7 E93 "Memory chip (EEPROM) error."

Cause

Memory chip (EEPROM) on control PCB can not read/write weld parameters.

Verification/Remedy

a) Replace Control Board PCB4 (WK-5549).
- Refer to section 7.3.4 for the replacement of PCB4.

6.3 Verification and Remedy to Failures without Indication Codes

Refer to Note on Section 11.02.

6.3.1 "Cooling Fan (FAN1) Failure" (Fan is not rotating.)

Cause

Occurs when the cooling fan (FAN1) is defective, damaged or the driving voltage is incorrect.

Verification/Remedy

a) Verify the cooling fan, FAN1.
- Inspect the condition of the fan blades and all peripheral parts. Clean the fan blades and all peripheral parts if covered with dust. Cleaning and removing dust from the fan blades once every 6 months in a normal environment is recommended. Extremely dusty environments will require more frequent cleanings.
- Verify that there are no wiring harnesses entangled inside the fan, confirm that the harnesses do not have any brakes in the wire or damaged connectors.
- Replace wiring harnesses if you find any broken connectors or damaged wiring harnesses.
- Replace the fan if there are any broken, cracked or missing fan blades. Refer to section 7.3-11.

b) Verify the wiring harness between the cooling fan (FAN1) and CN2 on PCB1 (WK-5713).
- Verify a secure connection of the harness to CN2 on PCB1.

c) Verify the drive circuitry of the cooling fan (FAN1) on PCB1.
- Verify the drive circuitry of the cooling fan (FAN1) on PCB3.
- Refer to section 6.5-3.
- Replace PCB1 if necessary. Refer to section 7.3.1.

6.3.2 "Gas Valve Failure" (No Gas flow through unit)

Cause

Occurs when the gas valve (SOL1) is defective, damaged or the driving voltage is incorrect.

Verification/Remedy

a) Verify that TIG welding is selected on the welding mode.
- Do not change welding modes while welding. Only change welding modes when the unit is idle (torch switch OFF).
- Verify the setting of Pre-flow and Post-flow on the front panel. If the Pre-flow or Post-flow time is set to 0 seconds, change them to higher setting.

b) Verify the layout the of gas hose.
- Verify that the hose is securely connected into the fitting at the inlet and the outlet. Verify the layout of the gas hose so that it is not bent or kinked. Verify there are no breaks, burns or holes in the hose.
- Verify the layout of the TIG torch gas hose and that the hose adapters are properly connected.

c) Verify the wiring harness and connection of gas valve (SOL1) and CN2 on PCB1 (WK-5713).
- Verify a secure connection of the harness to CN2 on PCB1.

d) Verify the drive circuitry of the gas valve (SOL1).
- Verify the drive circuitry of the gas valve (SOL1).
- Refer to section 6.5-4.
- Replace PCB1, when abnormal. Refer to section 7.3-1.

e) Replace PCB4 (WK-5449) and PCB5 (WK-5448).
- Refer to section 7.3-4, 3-5 for the replacement of PCB4 and PCB5.

6.3.3 "No weld output"

When in High Frequency TIG (HF TIG) mode, if the High Frequency is not generated (present), refer to "High Frequency Output Failure". Refer to the page 6-7.

Cause

Occurs when the remote connector (CON1) or associated circuitry is defective, damaged, or the TIG torch cable is defective.

Verification/Remedy

CAUTION

Read and understand this entire section before proceeding. Extreme personal harm and test equipment damage will occur if the procedures are not performed accurately.

a) Verify the remote connector (CON1). (Applies to LIFT TIG and High Frequency TIG (HF TIG) mode.)
- Verify a secure between the remote connector (CON1) and the TIG torch cable.
- Verify a secure connection of the harness and the connections between the remote connector (CON1) and CN1 on PCB1 (WK-5713) are all correct and there are no open circuits.
- Contact the manufacture if you find any broken connectors or damaged wiring harnesses.
- Verify the proper pins-outs of the remote connector at the TIG Torch side. (Refer to section in the Operating Manual.)
- Verify that there is no open circuit on the remote connector at TIG Torch side.
- In equipment for remote control use, Verify the pin specification of a connector. (Refer to section in the Operating Manual.)

b) Verify the condition and connections of the welding cable, the stick rod holders and the ground clamp. (Applies to all welding modes.)
- Verify a secure connection of the welding cable, stick rod holders, ground clamp and dense connectors and there are no open circuits.

c) Verify the no-load voltage (OCV). (Applies to STICK, High Frequency TIG (HF TIG) mode.)
- Refer to the section "Verification of No-load voltage (No OCV)" in the page 6-13.
- If performing the "No-Load Voltage Failure" procedure does not rectify the failure, perform the following tests in the sequence below. Replace any defective components found.

1) Secondary diode (D2-D3)
- Verification. Refer to the page 6-12.
- Replacement. Refer to the page 7-15.

2) Coupling coil (C.C.) and Reactor (FCH1)
- Replacement C.C. Refer to the page 7-15.
- Replacement FCH1. Refer to the page 7-15.

3) Transformer (T1)
- Replacement T1. Refer to the page 12-10.

4) Primary IGBT (Q1A-Q4C)
- Verification. Refer to the page 6-12.
- Replacement. Refer to the page 7-13, 14.

5) Hall C.T. (CT1)
- Replacement CT1. Refer to the page 7-17.

6.3.4 "Operating Panel Failure" (LED's do not light properly or welding setting cannot be established.)

Cause

Occurs when there is a connection failure among PCB1 (WK-5713), PCB5 (WK-5448), PCB6 (WK-5460) and PCB1 or PCB5 or PCB6 are defective.

Verification/Remedy

a) Verify the harness connection between CN101 on PCB1 (WK-5713) and CN1 on PCB4 (WK-5499).
- Verify a secure connection of the harness and the connections between CN101 on PCB1 and CN1 on PCB5.
- Contact the manufacture if you find any broken connectors or damaged wiring harnesses.

b) Verify the connection between PCB5 (WK-5448) and PCB4 (WK-5460).
- Verify that there is no omission of a loosening screws and connected harness between the PCB4 and PCB5.
- Replace PCB4 and PCB5 if necessary. Refer to the page 7-11, 12.

6.3.5 "High Frequency Output Failure" (Unit does not generate High Frequency.)

Cause

Occurs when the HF. unit (HF UNIT1) is defective or blown.

Verification/Remedy

CAUTION

Read and understand this entire section before proceeding. Extreme personal harm and test equipment damage will occur if the procedures are not performed accurately. The unit will generate a High Voltage component that can cause extreme personal harm and test equipment damage.Capacitors installed inside the Welding Power Source are electrically charged for a while after the Mains ON/OFF switch or distribution panel switch has been turned off. Before inspecting the inside of the Welding Power Source, leave it for about 5 min. after switching off power for discharging the capacitors, and then remove the top and side panels.

a) Verify the connection between High Frequency (HF UNIT1) and Coupling Coil (C.C.).
- Verify the connection between the HF UNIT1 and C.C.; Verify that the quick-disconnect terminals are inserted onto the terminals of HF UNIT1 (TB5- TB6) correctly and completely.
- Verify there are no short circuits, burnt or broken wires at C.C.
- Replace C.C. Refer to the page 7-15.

b) Verify the connection between High Frequency (HF UNIT1) and the current limiting resistors (R3 and R4).
- Verify the connection between HF UNIT1 and the R3 (R4) Verify that the quick-disconnect terminals are inserted onto the terminals of HF UNIT1 (TB3-TB4) correctly and completely.
- Verify there are no short circuits, burnt or broken wires between the HF UNIT1 and the R3 (R4).

c) Verify the connection between the terminals between AC1-AC2 (TB1-TB2).
- Verify the connection between AC1-AC2, Verify that the quick-disconnect terminals are inserted onto the terminals of HF UNIT1 correctly and completely.
- Verify there are no short circuits, burnt or broken wires between AC1 and AC2.

d) Verify and replace the Gap (GAP) of the High Frequency Unit (HF UNIT1).
- Verify that the GAP is connected to HF UNIT1 correctly and completely.
- Verify there is no dust or foreign debris between the space of the GAP.
- If there are any abnormalities observed with the GAP, replace the GAP.
- The gap is set to 1.0mm.

  In the case of a gap 1.0mm or more, high frequency voltage and a period increase.

  In the case of a gap 1.0mm or less, high frequency voltage and a period decrease.

6.4 Fault Isolation Tests

6.4.1 Preparation

The following initial conditions must be met prior to starting any of the procedures in this section.

1) Connect the appropriate input voltage. (Check the name plate on the rear of the power supply for the proper input voltage.)

NOTE

Operate at ALL input voltages as noted on the nameplate on the rear panel when testing the power supply.

2) Remove the Side Panel. Refer to the section 6.1.1.

3. Close primary power source wall disconnect switch or circuit breaker.

4) Place power supply MAIN CIRCUIT SWITCH (S1) on rear of unit in the ON position.

WARNING

Dangerous voltage and power levels are present inside this unit. Be sure the operator is equipped with proper gloves, clothing and eye and ear protection. Make sure no part of the operator's body comes into contact with the workpiece or any internal components while the unit is activated.

6.5 Verification of the Power Input Circuitry

CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 6.4.1 "Preparation".

6.5.1 Verification of the AC input voltage using an AC voltmeter

1) Verify input voltage (Phase-to Phase) using an AC voltmeter. (The capability of the voltmeter should be more than 600VAC). Measure the point between lines U1 and V1 on the input switch, S1.

The location of points U1 and V1 on switch S1 are indicated in Figure 6-7.

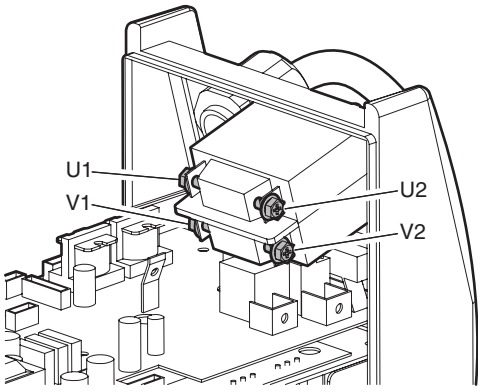


Figure 6-7: Check points U1, U2, V1 and V2

2) If the input voltage is out of the operating range of the unit, which is ±10% (207~253VAC) of the rated voltage (230V), verify the available power capacity at the installed site.

If the input voltage is within the operating range, recheck the input voltage while welding, as welding may cause the input voltage to decrease to a value below the operating range of the unit.

3) Verify input voltage after the input switch (S1) using an AC voltmeter. (The capability of the voltmeter should be more than 600VAC.)

- Using an AC voltmeter, measure between the

points U2 and V2 on the input switch, S1.

The location of points U2 and V2 on switch S1 are indicated in Figure 6-7.

4) If this voltage is out of the operating range, which is ±10% (207~253VAC) of the rated voltage (230V), replace S1 following the process in section 12.3-4.

5) Verify the rectified output voltage of the primary diode, D1 using a DC voltmeter. (The capability of the voltmeter should be more than 400VDC.) Using a DC voltmeter, measure between the points "+" [+] and "-" [-] on D1. Points "+" and "-" are on PCB1 (WK-5713). See Figure 11-8. The measured voltage should be approximately 1.4 times larger than input voltage measured in #1 above. Replace diode D1 if the calculated measurement is not within the corresponding range (285~360VDC) following the process in section 7.3-4.

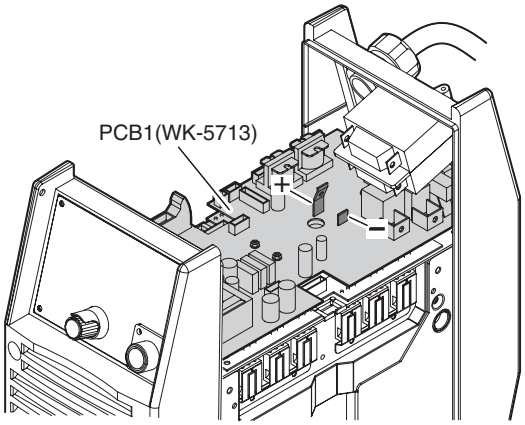


Figure 6-8: The check points "+" and "-"

6) Verify bus voltage (the voltage of the electrolytic capacitor after rectification) using a DC voltmeter. (The capability of the voltmeter should be more than 500VDC.) Using a DC voltmeter, measure between the points TB1(P)[+] and TB3(N)[-] on PCB1 (WK-5713). Points TB1(P) and TB2(N) can be found on the parts side of PCB2. See Figure 11-9. The measured voltage should be approximately 1.4 times larger than input voltage measured in #1 above. Replace diode D1 if the calculated measurement is not within the corresponding range (285 ~ 360VDC) following the process in section 7.3-1.

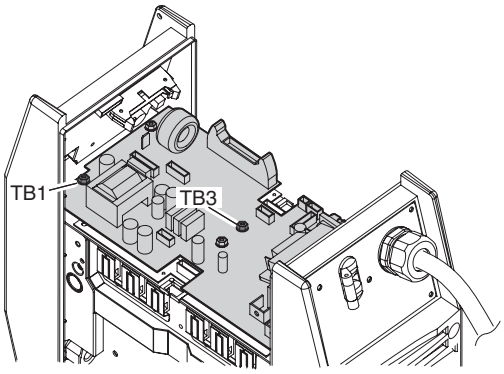


Figure 6-9: The check points TB1(P) and TB3(N)

7) After the replacement of D1, if the above voltage is still abnormal, replace PCB1 (WK-5713).

6.5.2 Verification of the Power Supply Voltage

CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 6.4.1 "Preparation".

1) Verify Power Supply voltage using an DC voltmeter. (The capability of the voltmeter should be more than 50VDC.) Operate at all input voltages as noted on the nameplate on the rear panel when testing the power supply.

2) On the PCB5 (WK-5448) and PCB4 (WK-5449), measure the voltages according to the following table. The check points and the reference are obtainable on the solder side of PCB4 (WK-5449). The locations of points are indicated in Figure 6-10.

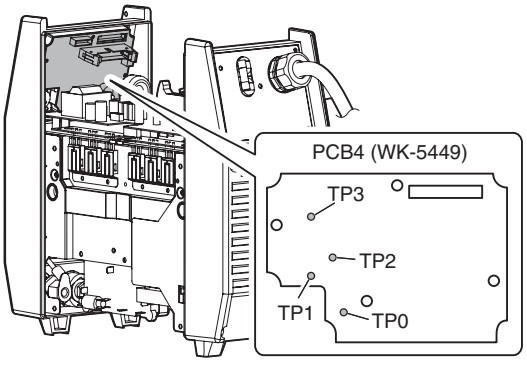


Figure 6-10: Checkpoints TP0-TP3 on PCB6

Test Point PCB6	Reference PCB6	ACCEPTABLE VALUE
TP1	TP0	+5VDC
TP2	TP0	+12VDC
TP3	TP0	–12VDC

Table 6-1: Checkpoints TP0-TP3 on PCB6

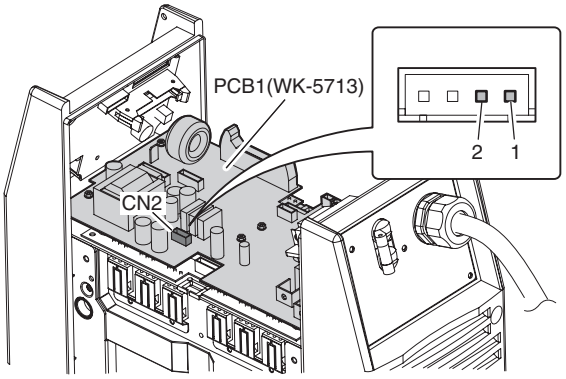


Figure 11-11: Checkpoints CN2 on PCB1

Test Point PCB1	Reference PCB1	ACCEPTABLE VALUE
PIN 1 on CN	PIN 2 on CN2	+24VDC

Table 6-2: Checkpoints CN2 on PCB1

3) If any of these voltages are not present or are below a 10% tolerance, replace PCB1 (WK-5713).
Refer to page 7-5.

6.5.3 Verification of the Cooling Fan, FAN1, Drive Circuitry

CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described in section 6.4.1 "Preparation".

1) Verify the condition of the cooling fan, FAN1, using a DC voltmeter. (The capability of the voltmeter should be more than 50VDC.) Using a DC voltmeter, measure between PIN 1 (Positive [+]) and PIN 2 (Negative [-]) of CN11 on PCB3 (WK-5548). The location of connector CN11 of PCB3 is indicated in Figure 6-12. When you measure the above voltage, do not remove the connector. Conduct the measurement while the connector plug and receptacle are still connected.

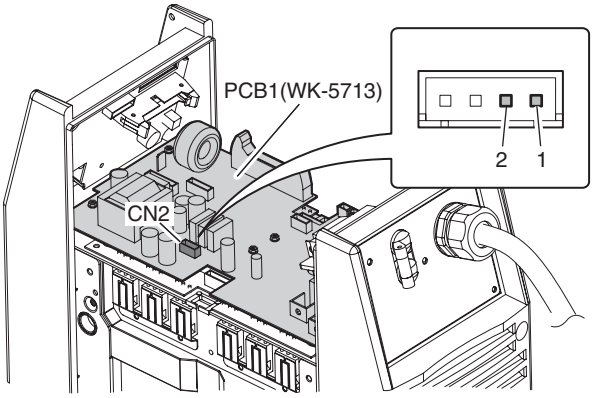


Figure 6-12: Verification of the FAN1

2) Using the measurement taken above, follow the chart below for possible failure modes.

	FAN1 Status	Voltage measurement. (1PIN-2PIN of CN2 on PCB1)	Remedy
Case 1	Rotating	DC 18 ~ 25V	FAN1 drive circuit is normal.
Case 2	Rotating	Below DC 18V	ReplacePCB1. Refer to the page 7-5.

	FAN1 Status	Voltage measurement. (1PIN-2PIN of CN2 on PCB1)	Remedy
Case 3	Inactive	Below DC 18V	Replace PCB1. Refer to the page 7-5. ↓ Perform "2. Verification of the Power Supply Voltage Test". Refer to the page 6-9.
Case 4	Inactive	DC 18 ~ 25V	Replace the FAN1.Refer to the page 7-18.

Table 6-3: Verification of the FAN1

- At the time of a low output and standby, as for this equipment, rotation of a fan becomes slow. Therefore, exact voltage measuring becomes impossible. Perform the check of voltage in the state of abnormalities.
- When verifying the voltage, Verify that the AC input voltage remain within the operating range of the unit. (The AC input does not drop below 180VAC).

6.5.4 Verification of the Gas Valve, SOL1, Drive Circuitry

CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described at the beginning of an above section "1.Preparation". Refer to section 6.4-1.

1) Verify the voltage between the 3PIN (Positive [+]) and 4PIN (Negative [-]) of connector CN2 on PCB1 (WK-5713) while you press the torch switch while in TIG Mode. (The capacity of the voltmeter should be more than 50VDC.) The location of connector CN2 of PCB1 (WK-5713) is indicated in Figure 11-13. When you measure the above voltage, do not remove the connector. Conduct the measurement while the connector plug and receptacle are still connected.

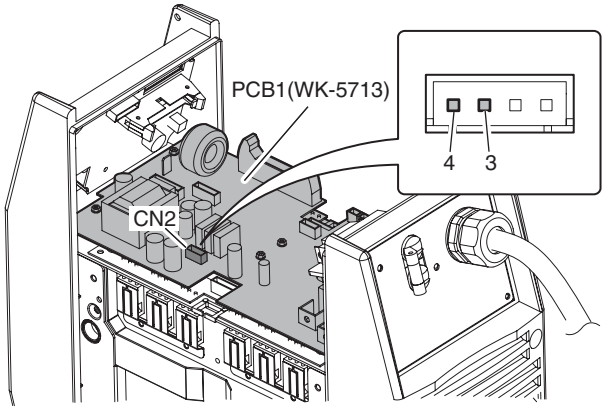


Figure 6-13: Verification of the SOL1

2) Using the measurement taken above, follow the chart below for possible failure modes.

	Voltage measurement. (1PIN-2PIN of CN2 on PCB1)	Remedy
Case1	Below DC 18V	Replace PCB1.Refer to the page 7-5.
Case2	DC 18 ~ 25V	Replace SOL1.Refer to the page 7-20.

Table 6-4: Verification of the SOL1

3) When verifying the voltage, Verify that the AC input voltage remain within the operating range of the unit. (The AC input does not drop below 180VAC).

6.5.5 Verification of the primary Diode (D1)

CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described at the beginning of an above section "1.Preparation". Refer to section 6.4-1.

1) Verify the characteristic of the primary diode, D1, using a diode tester.

2) Refer to Table 11-5 and Figure 11-14 for the checkpoints on D1.

COMPONENT TESTED	TERMINALS		ACCEPTABLE VALUE
	Positive lead	Negative lead	
Diode of D1	1, 2, 3 5	5 1, 2, 3	0.3 to 0.5V Open
Diode of D1	1, 2, 3 4	4 1, 2, 3	Open 0.3 to 0.5V

Table 6-5: Tester checkpoints for D1

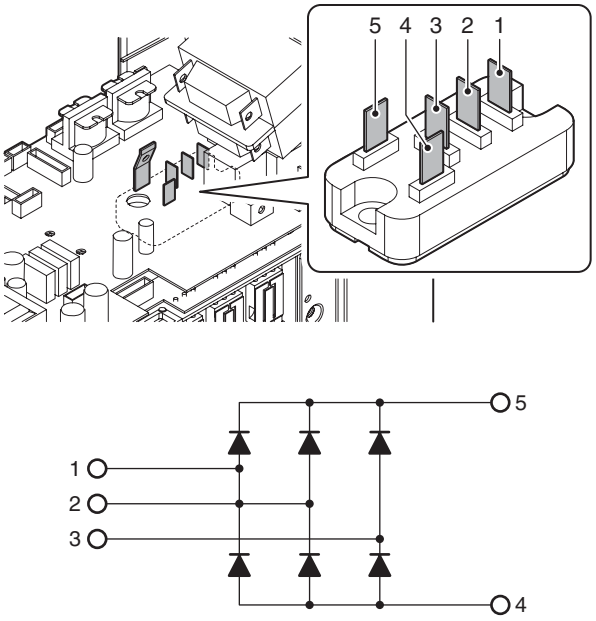


Figure 6-14: Tester checkpoints in the D1 inter-connection diagrams

6.5.6 Verification of the secondary Diode (D2, D3)

CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described at the beginning of an above section "1.Preparation". Refer to section 6.4-1.

1) Verify the characteristic of the secondary diode, D2 and D3, using a diode tester.
2) Refer to Table 6-6 and Figure 6-15 for the checkpoints on D2 and D3.

COMPONENT TESTED	TERMINALS		ACCEPTABLE VALUE
	Positive lead	Negative lead	
Diode 1 of D2, and D3,	Anode Cathode	Cathode Anode	0.2 to 0.3V Open
Diode 2 of D2, and D3,	Anode Cathode	Cathode Anode	0.2 to 0.3V Open

Table 11-6: Tester checkpoints for D2 and D3

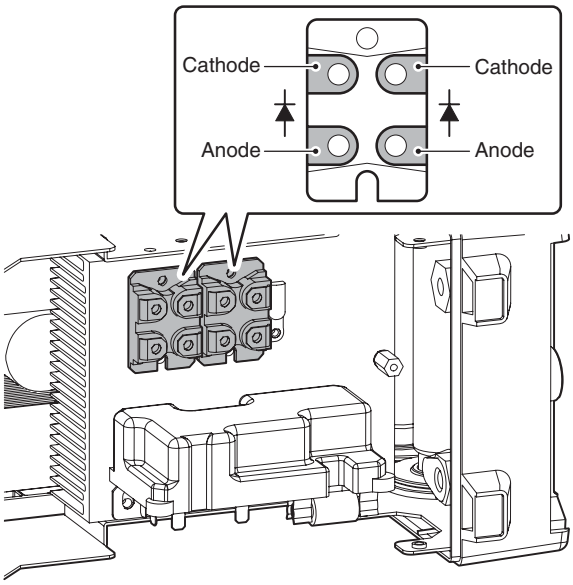


Figure 6-15: Tester checkpoints for D2 and D3

6.5.7 Verification of the primary IGBT (Q1A-Q4C)

CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described at the beginning of an above section "1.Preparation". Refer to section 11.4-1.

1) Check whether there are any abnormalities on the appearance of PCB6 and PCB7.
2) Verify the characteristic of the primary IGBT (Q1A-Q4C), using a diode tester.
3) Refer to Table 11-7 and Figure 11-16 for the checkpoints on PCB6 and PCB7.

COMPONENT TESTED	TERMINALS		ACCEPTABLE VALUE
	Positive lead	Negative lead	
Collector-Emitter of Q1A~Q2C with PCB6	C CE	CE C	Open 0.2 to 0.5V
Collector-Emitter of Q3A~Q4C with PCB7	CE E	E CE	Open 0.2 to 0.5V

Table 6-7: Tester checkpoints for Q1A-Q4C

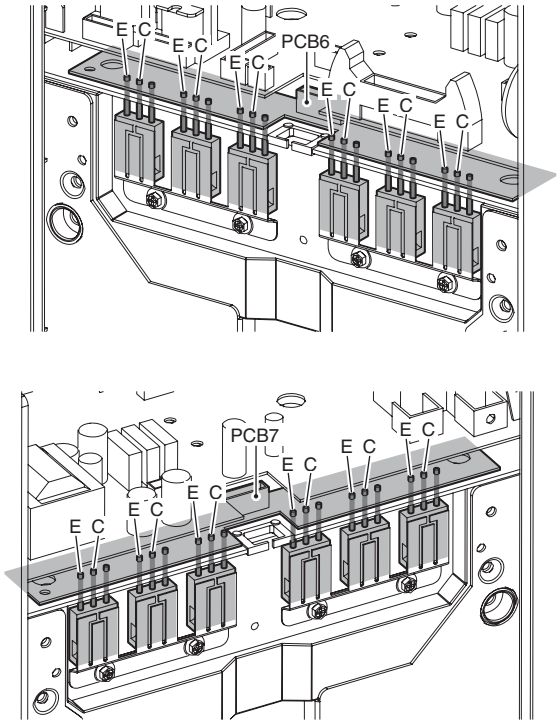


Figure 6-16: Tester checkpoints for Q1A-Q4C

6.5.8 Verification of No-load Voltage (OCV)

CAUTION

Before performing any portion of the procedure below, make certain the unit is placed in the initial set up condition as described at the beginning of an above section "1.Preparation". Refer to section 6.4-1.

a) Verify the no-load voltage in STICK mode.

1) In STICK welding mode, mark and then turn potentiometer VR1 on PCB4 (WK-5449) all the way to the right and turn off the electric shock protector function (Voltage-Reduction-Device, VRD).
Refer to section 5.08.

WARNING

Electric shock hazard. The unit will generate OCV immediately when Process mode is put into the state of on pushing Process button enabling STICK mode.

2) Verify the no-load voltage using a DC voltmeter. (The capability of the voltmeter should be more than 100VDC.)

3) The normal no-load voltage is approximately 65V.

b) Verify the no-load voltage (OCV) in High Frequency TIG mode.

WARNING

This welding mode produces high frequency and high voltage. Extra care shall be taken to prevent electric shock.

1) When in HF TIG mode, the unit will generate high voltage. To prevent personal harm and test equipment damage, mark and then remove the indicated wire from the HF UNIT1 shown in Figure 11-18. To prevent electric shock, always wrap the removed wire with electrical tape or other suitable insulation.

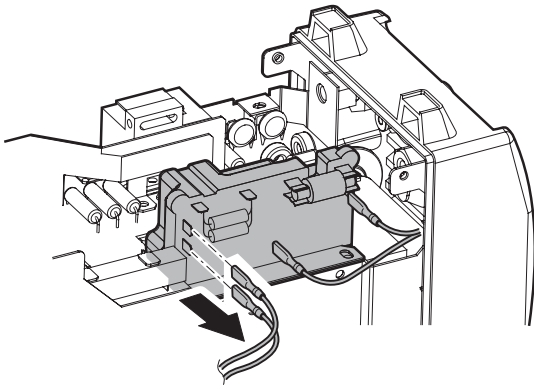


Figure 6-17: Removal and installation from the HF UNIT1
(To disable the operation of the HF unit.)

2) Press the Welding mode selection button to select HF TIG welding mode.
3) While depressing the Torch switch, verify the OCV using a DC voltmeter. (The capability of the voltmeter should be more than 100VDC.) The check point with a tester is the voltage between output terminal + and -. In TIG mode, the OCV ceases 3 seconds after you depress the torch switch.
4) The normal no-load voltage is approximately 65V.
5) Return the setting variable resister (VR1) to the original position. (Return to the position recorded by “a. 1)” clause.)

   ? fully clockwise : VRD ON

   ? fully counterclockwise : VRD OFF
6) Return connection with HF UNIT1 to the original position.

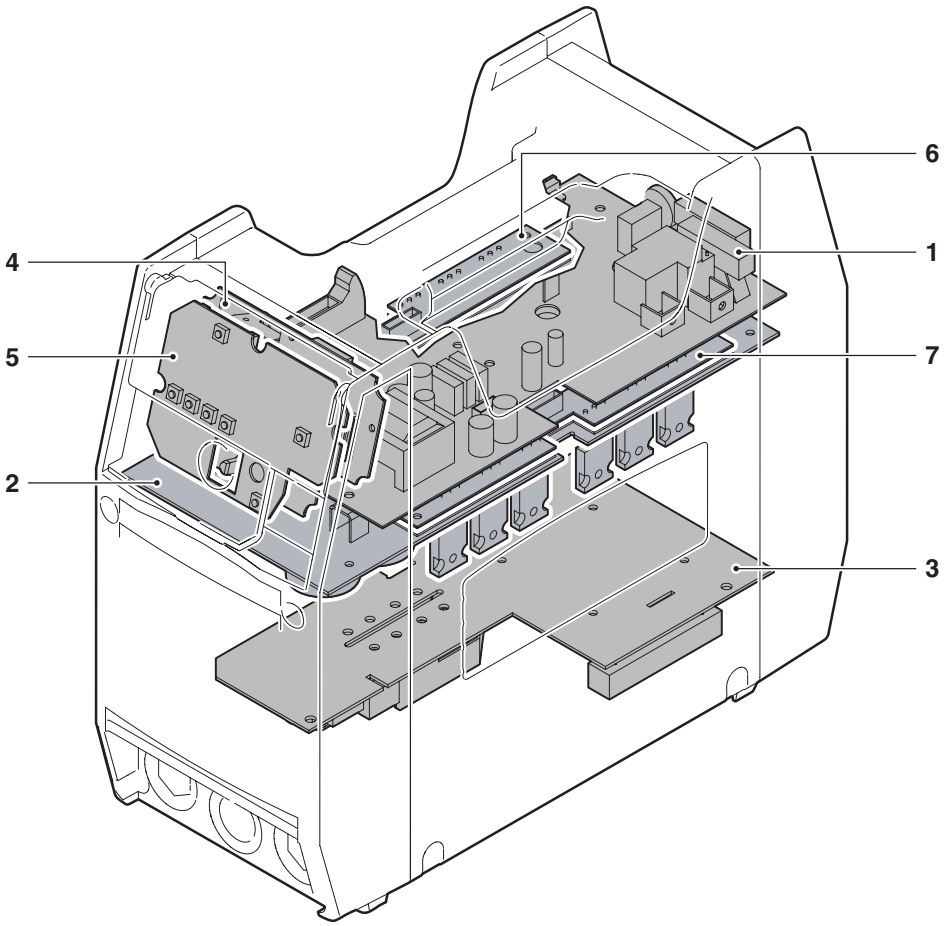
7 MAINTENANCE

7.1 Subsystem Test and Replacement Procedures

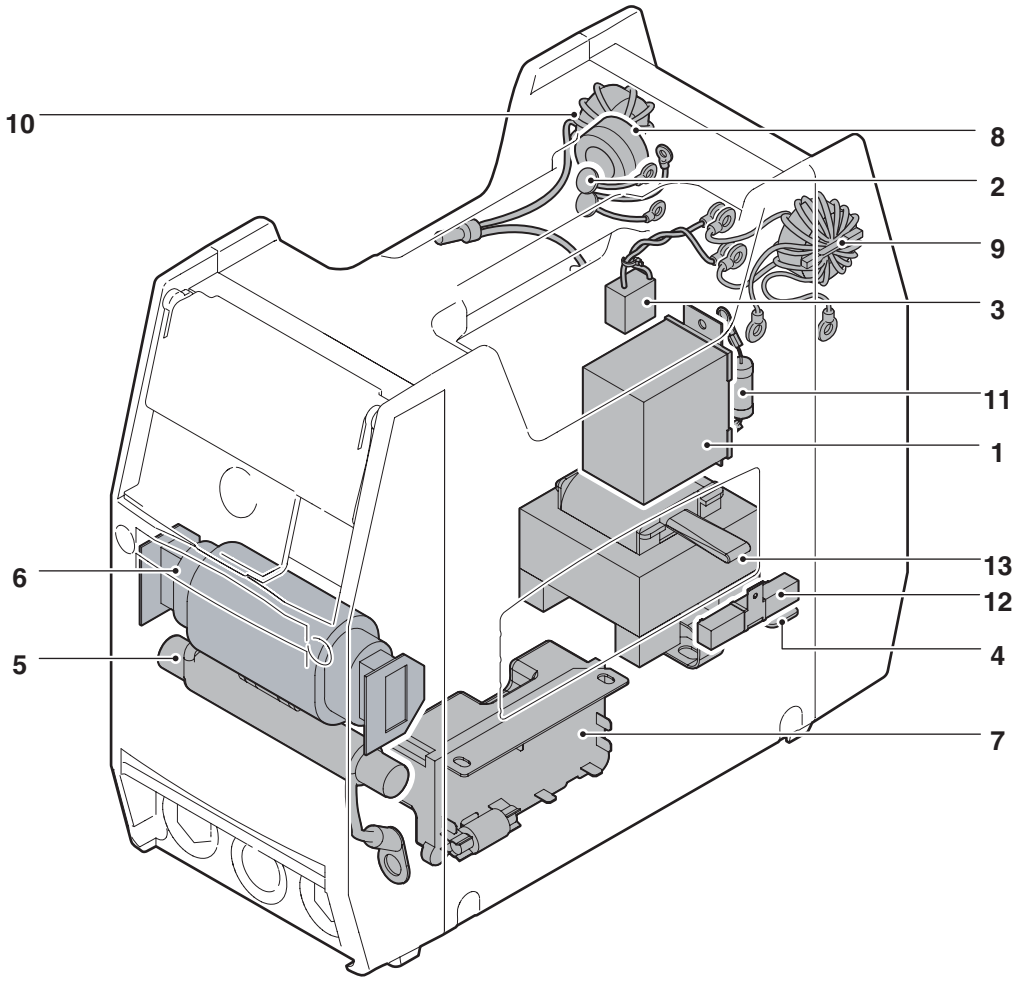
7.1.1 Preparation

This section provides specific procedures for verifying the operation and replacement of each subsystem within the power supply.
Before undertaking any of these procedures, eliminate the obvious first-visually inspect the suspect subsystem for physical damage, overheating, and loose connections.

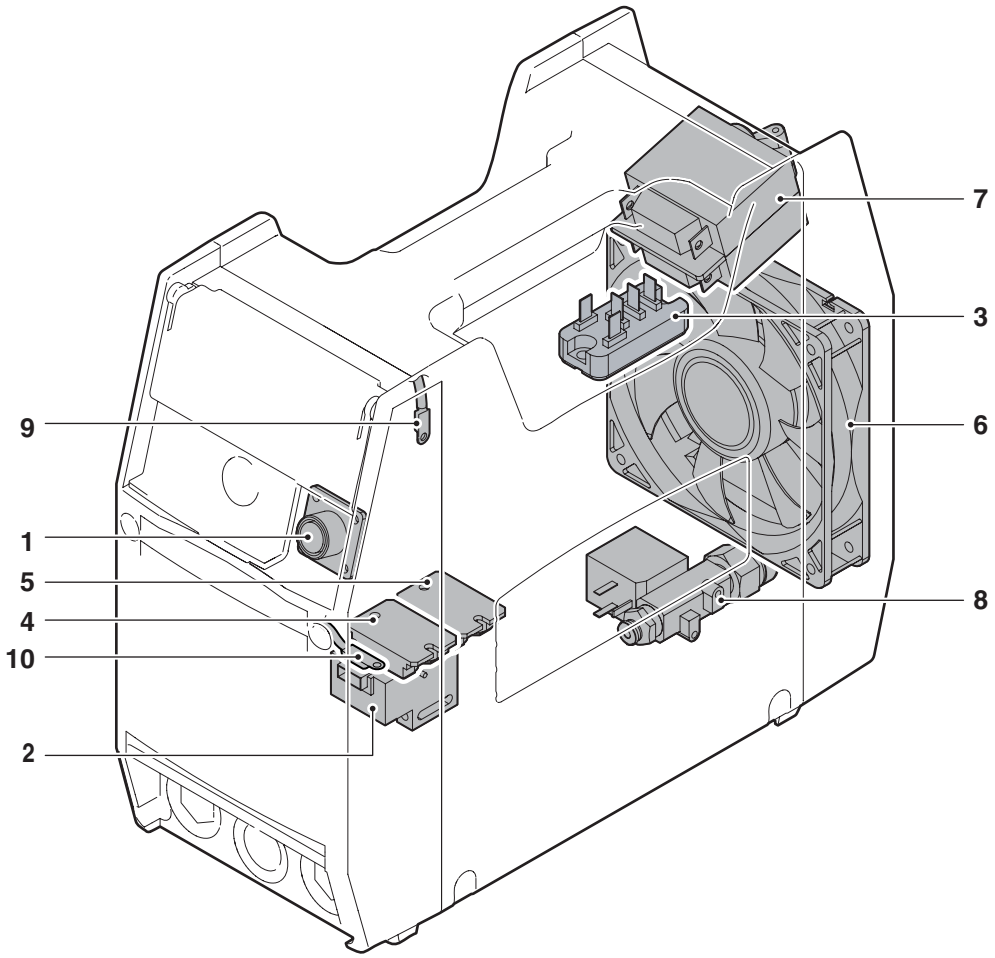
7.1.2 Test and Replacement Parts List



NO.	DWG NO.	PARTS NAME	REFERENCE PAGE	PARTNO.
1	PCB1	Printed Circuit Board (WK-5713)	12-5	W7001626
2	PCB2	Printed Circuit Board (WK-5714)	12-8	W7001627
3	PCB3	Printed Circuit Board (WK-5609)	12-10	W7001520
4	PCB4	Printed Circuit Board (WK-5449)	12-11	W7001412
5	PCB5	Printed Circuit Board (WK-5448)	12-12	W7001729
6	PCB6 (Q1A-Q2C)	Print Circuit Board (WK-5460) / Primary IGBT	12-13	W7001516
7	PCB7 (Q3A-Q4C)	Printed Circuit Board (WK-5460) / Primary IGBT	12-14	W7001516



NO.	DWG NO.	PARTS NAME	REFERENCE PAGE	PART NO.
1	C1	Capacitor	12-8	10-6510
2	C101-C102	Capacitor	12-21	W7001622
3	C103	Capacitor	12-24	W7001621
4	C2	Capacitor	12-25	W7001620
5	C.C.	Coupling Coil	12-15	W7001384
6	FCH1	Reactor	12-15	W7001502
7	HF - UNIT	High Freguency Unit	12-19	W7001399
8	L101	Ring Core	12-21	W7001623
9	L102	Reactor	12-24	W7001625
10	L103	Reactor	12-24	W7001624
11	R1	Resistor	12-8	W7001448
12	R2	Resistor	12-25	W7001619
13	T1	Transformer	12-10	W7001501

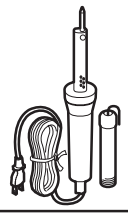
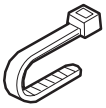


NO.	DWG NO.	PARTS NAME	REFERENCE PAGE	PARTNO.
1	CON1	Remote Receptacle	12-22	10-6627
2	CT1	Hall Current Trans	12-17	10-5003
3	D1	Primary Diode	12-5	W7001481
4	D2	Secondary Diode	12-15	10-6629
5	D3	Secondary Diode	12-15	10-6629
6	FAN1	Cooling Fan	12-18	10-5227
7	S1	Switch	12-21	W7001453
8	SOL1	Solenoid GAS Valve	12-20	W7001635
9	TH1	Primary Thermistor	12-23	10-5228
10	TH2	Secondary Thermistor	12-23	10-5228

7.2 Service Tools

7.2.1 Tools and parts

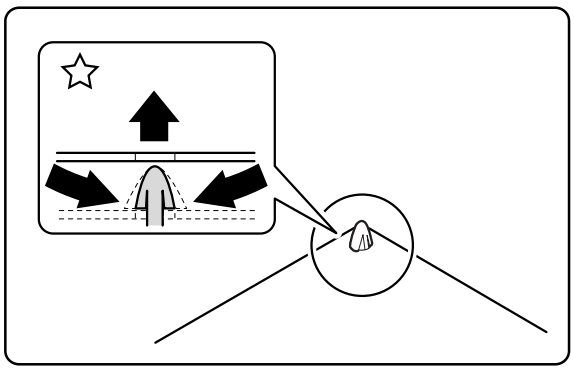
The tools and parts to be used for maintenance are shown by icons.

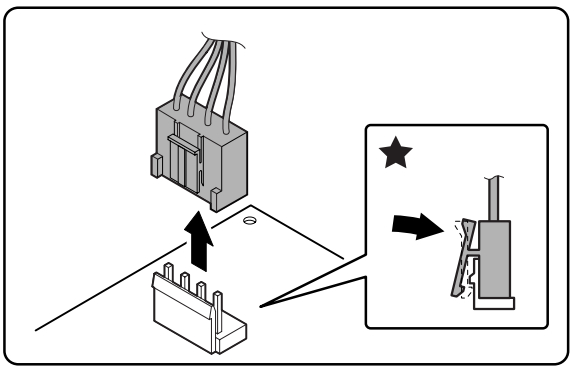
Spanner	Philips Head Screwdriver	Long Nose Pliers	C-Ring Pliers	Soldering Copper (solder)	Snap Band	Silicon Compound
						

7.2.2 Notes of disassembly and assembly

NOTE

When removing the locking type connectors and board supporters, disengage the locking mechanism first and then disconnect them.
Locking type connectors and board supporters are indicated in this manual using the following symbols; black star marks for locking connectors and white star marks for locking board supports.





NOTE

During your maintenance or repair, please cut any tie-wraps necessary. However, after your maintenance or repair, please reassemble and tie-wrap all components and wiring in the same manner as before the maintenance or repair.

CAUTION

Please note that you remove each connector, grasp and pull out by the connector part only. Do not pull the harness (cable) part.

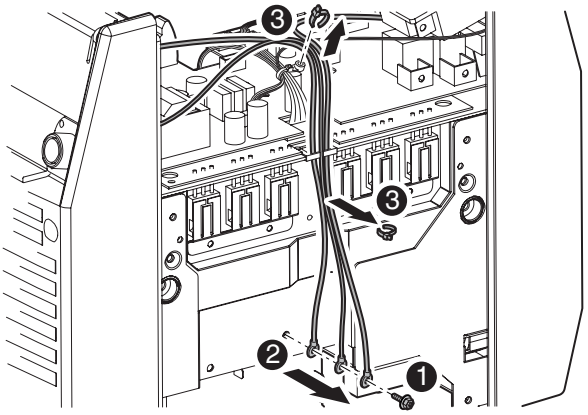
WARNING

The capacitors inside the power supply will slowly discharged after you turn off the switch of the power supply or the switch at the breaker box (distribution panel). Wait at least 5 minutes for the discharge to complete.Replacement Procedure.

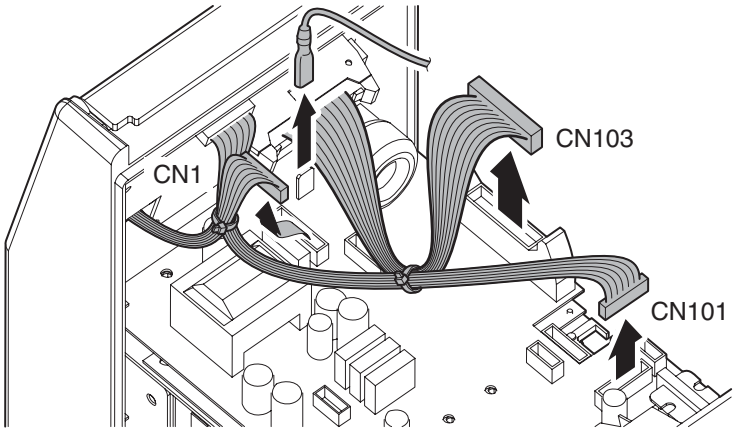
7.3 Replacement Procedure

7.3.1 PCB1 (WK-5713) and Primary Diode D1

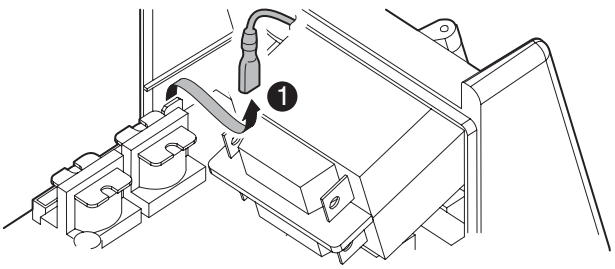
1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the L102. [See section “7.3-18”]
3) Remove the screw and three cables. Cut the snap band.



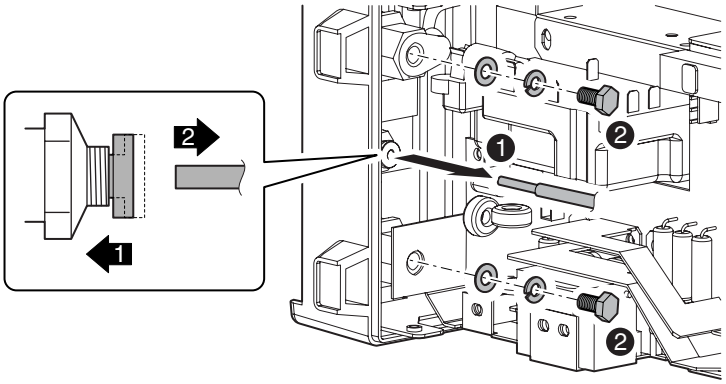
4) Remove the terminal and Disconnect the three connectors CN1 (PCB4), CN101, 103 (PCB1).



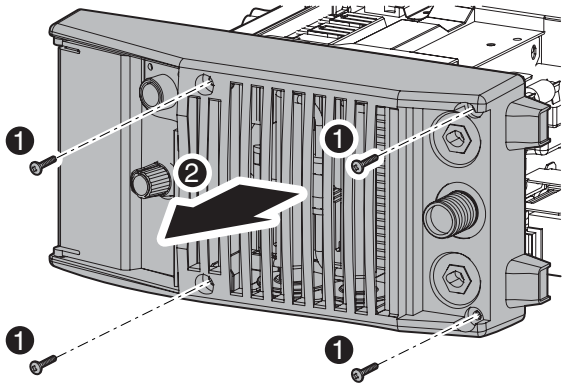
5) Remove the terminal.



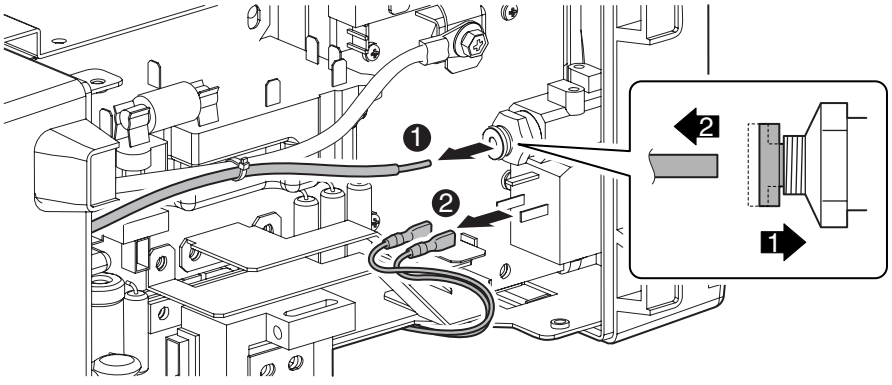
6) Remove the Gas Tube. Remove the two bolts, two toothed washers, and the terminal.



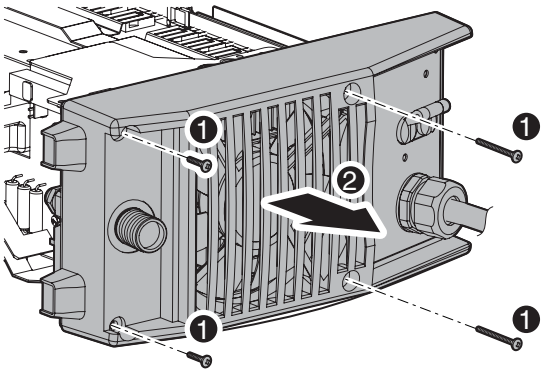
7) Remove the four screws and the Front Panel.



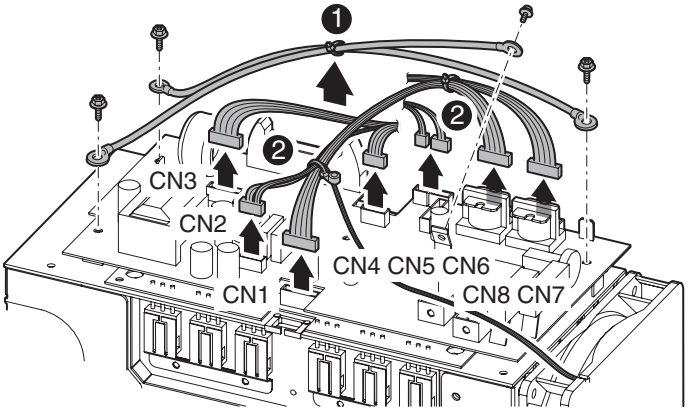
8) Remove the Gas Tube and the two cables.



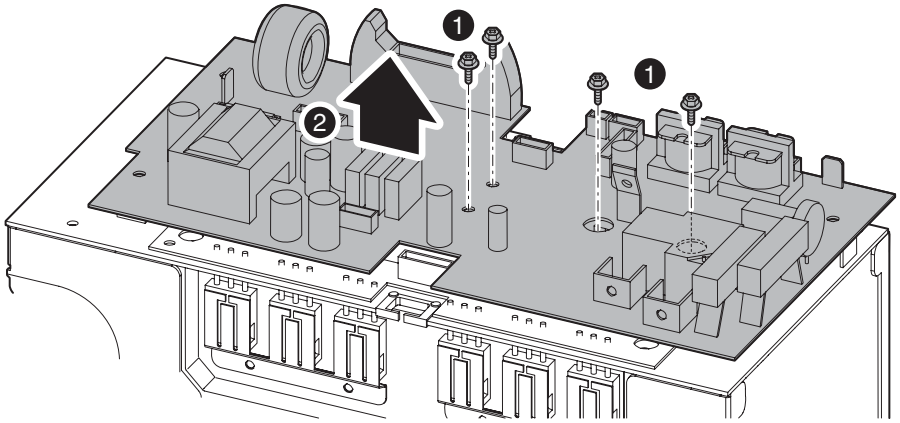
9) Remove the four screws and the Rear Panel.



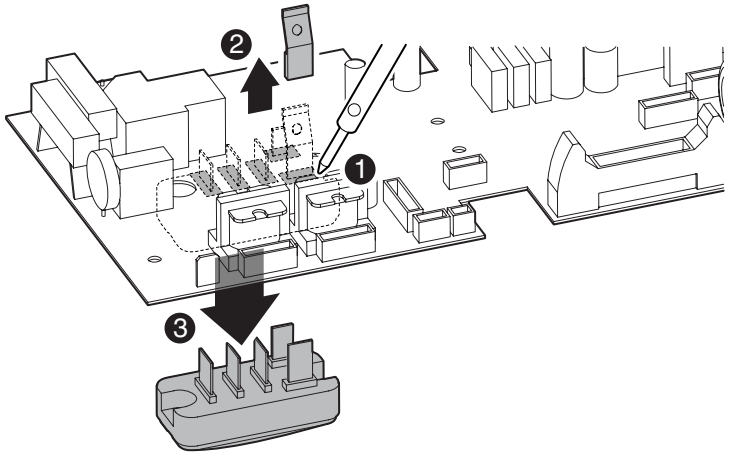
10) Remove the four screws and the two cables. Disconnect the eight connectors CN1-8 on the PCB1.



11) Remove the four screws and Remove the PCB1 unit.

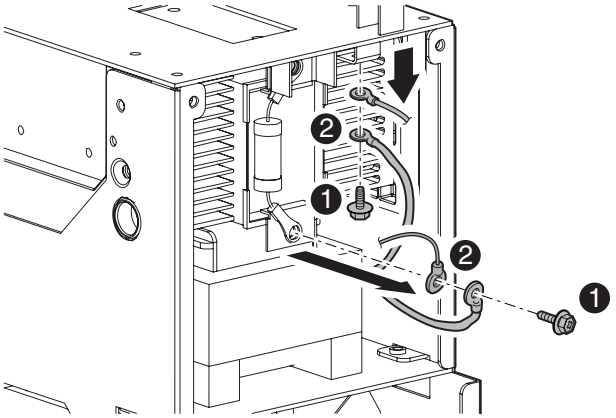


12) Remove the Primary Diode D1 with the soldering iron from the PCB1.
- Before installing a new diode, apply a uniform coat of silicone compound (Shinetsu Silicone G-747 or equivalent) on the base.

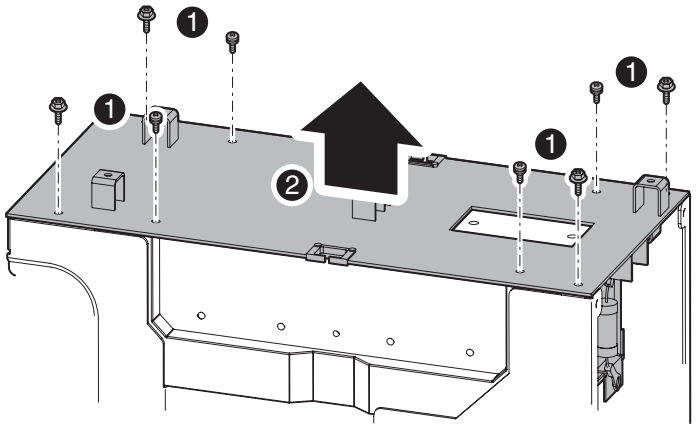


7.3.2 PCB2 (WK-5417), Capacitor C1 and Resistor R1

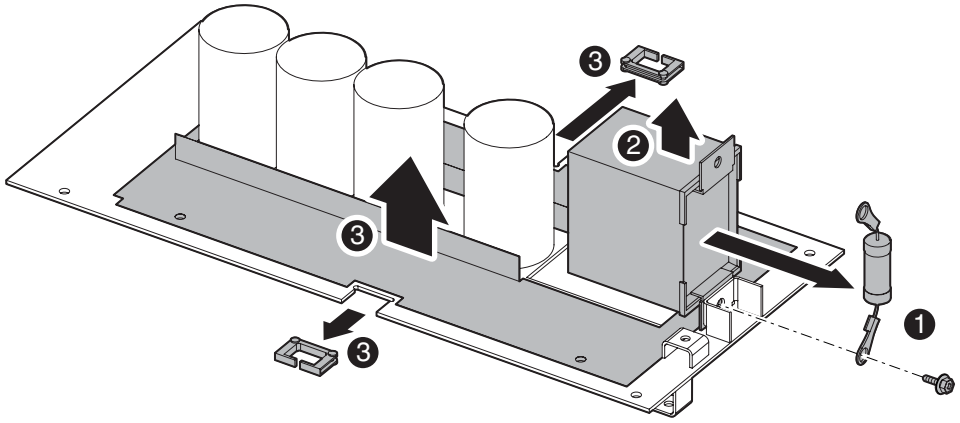
1) Remove the Side Panel. [See section "6.1-1"]
2) Remove the PCB1 and D1. [See section "7.3-1"]
3) Remove the PCB6 and PCB7. [See section “7.3-6, 3-7”]
4) Remove the screw and the cable.



5) Remove the eight screws and the PCB2 unit.

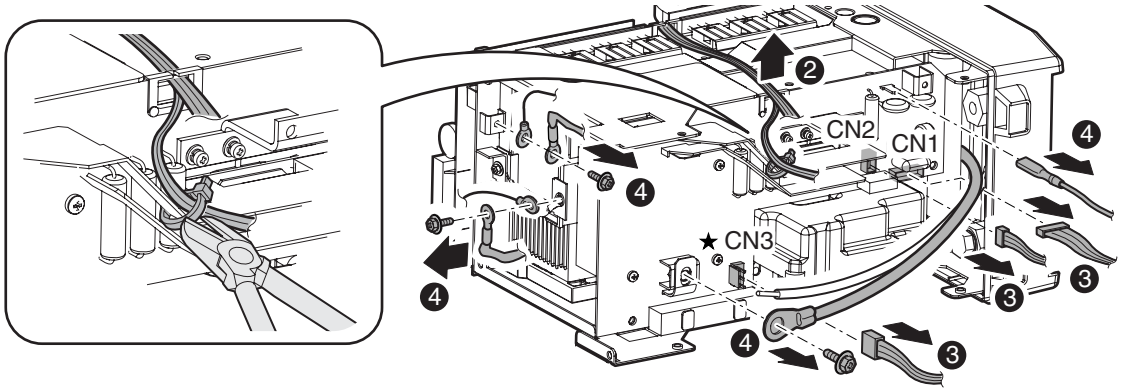


6) Remove the screw and Remove the Capacitor C1 and Resistor R1 from the PCB2. Remove the two edge holders and the PCB2 Insulation Sheet from PCB2.

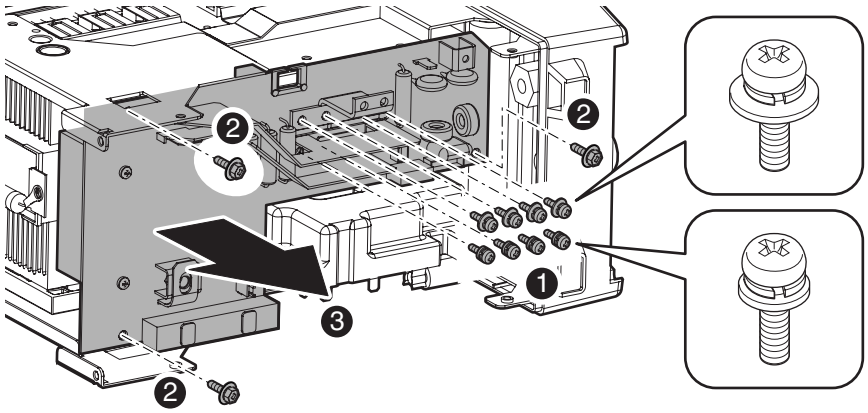


7.3.3 PCB3 (WK-5609) and T1 “Transformer”⊕

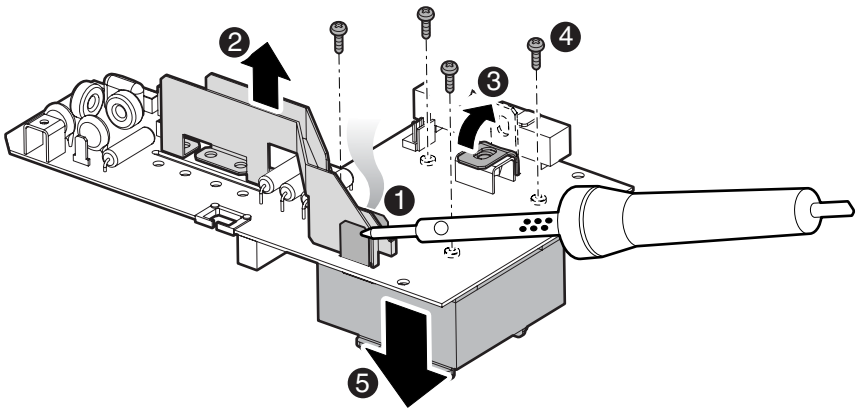
1) Remove the Side Panel. [See section "6.1-1"]
2) Remove the CT1. [See section “7.3-10”]
3) Cut the snap band and Remove the cables. Disconnect the three connectors CN1-3 on the PCB3. Remove the three screws and the three cables. Remove the terminal.



4) Remove the 11 screws and PCB3 unit.
   • Take care about the shape of the screw when you replace PCB3.

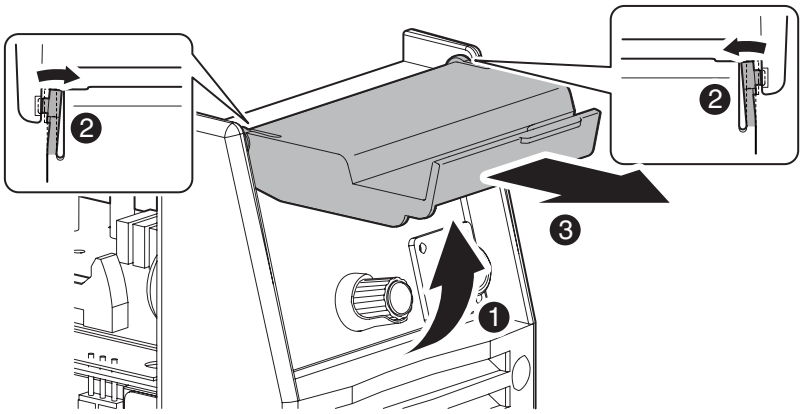


5) Remove the two tap of T1 with the soldering iron from the PCB3. Remove the T-D Bus Bar1 and the T-D Bus Bar2. Open the tap of T1 and Remove the four screws. Remove the T1 from the PCB3.

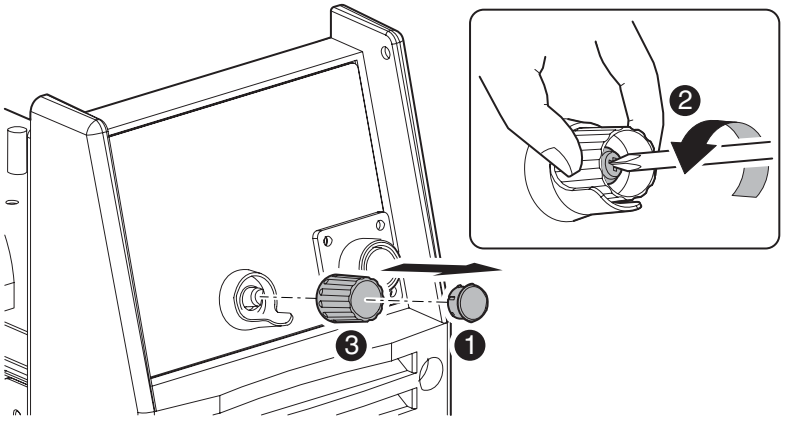


7.3.4 PCB4 (WK-5449)

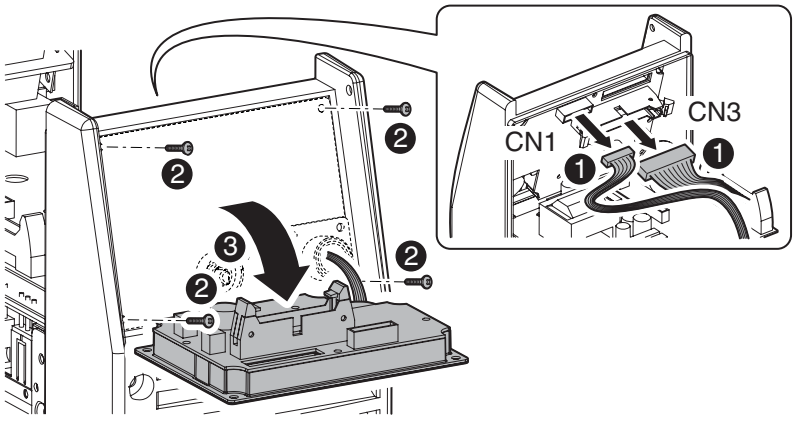
1) Remove the Side Panel. [See section "6.1-1"]
2) Remove the Protection Cover.



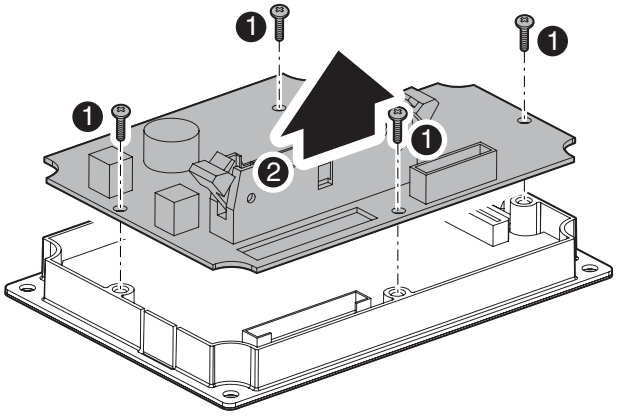
3) Remove the Knob Cap. Holding the Knob down, loosen the screw and remove the Knob.



4) Disconnect the two connectors CN1,3 on the PCB4. Remove the four screws. Pull out the operation panel and bring it down.

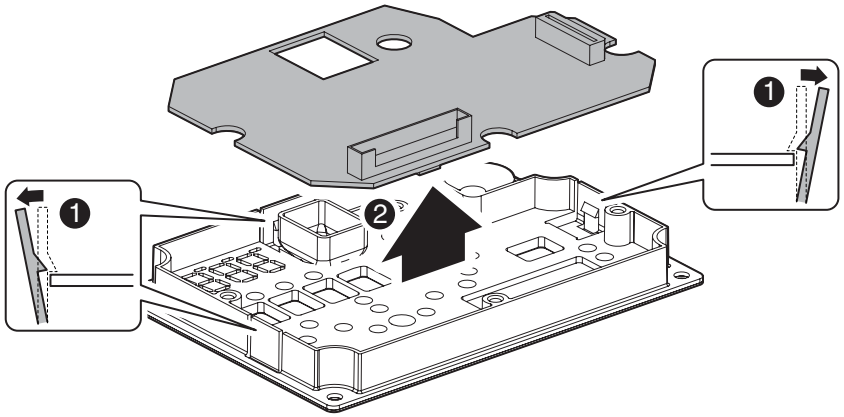


5) Remove the four screws. Remove the PCB4.

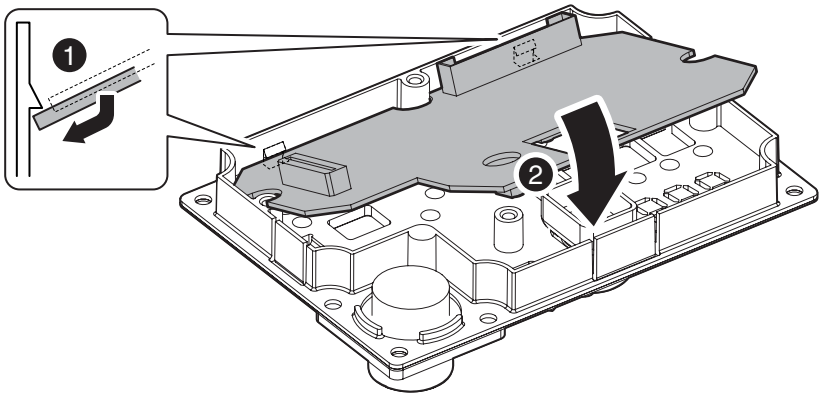


7.3.5 PCB5 (WK-5448)

1) Remove the Side Panel. [See section "11.1-1"]
2) Remove the PCB4. [See section “12.3-4”]
3) Remove the three latches of Front Control Cover and then remove the PCB5.

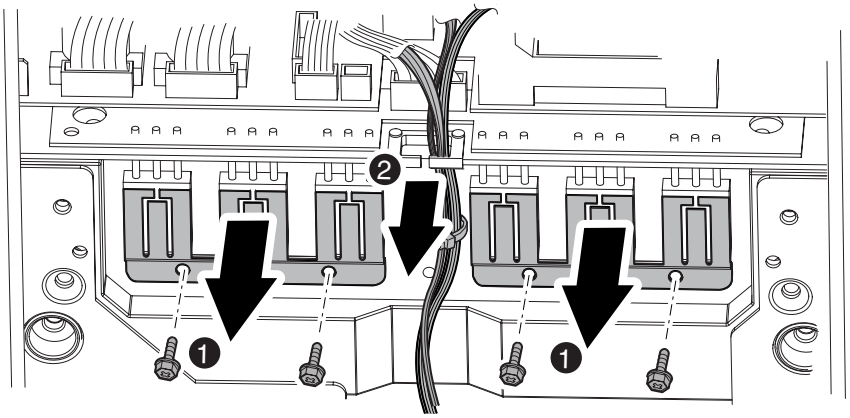


- When reinstalling the PCB5, engage two latches of Front Control Cover first.

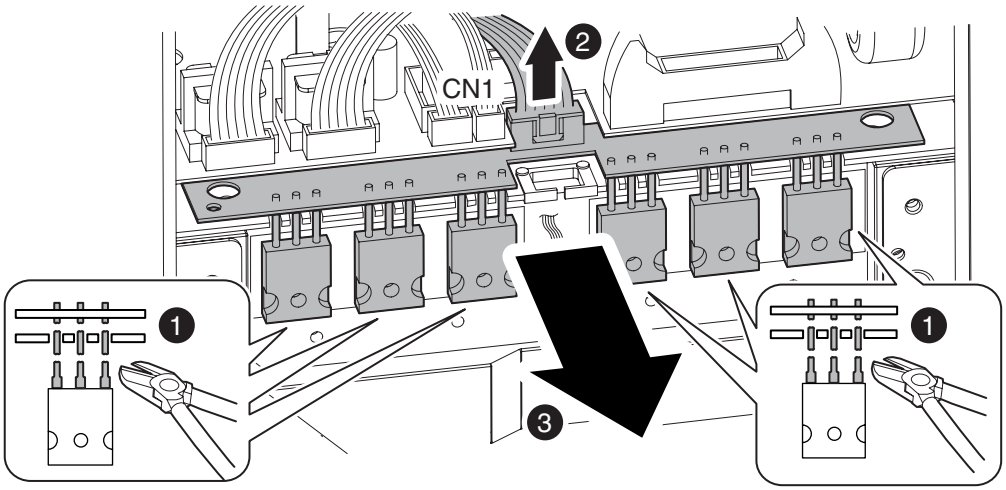


7.3.6 PCB6 (WK-5460) and Q1A-Q2C “Primary IGBT”

1) Remove the Side Panel. [See section "6.1-1"]
2) Remove the four screws and two IGBT Spring Clips. Remove the cables from edge holder.

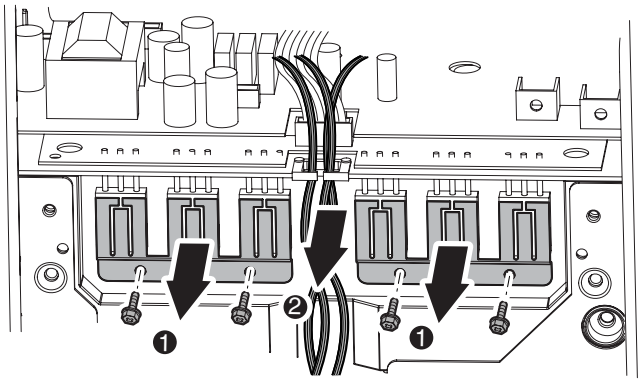


3) Disconnect the connector CN1 on the PCB6. Cut the lead of the Q1A-Q2C.
   - Remember to install new Silicone Rubber Sheets where silicone compound (Shinetsu Silicone G-747 or equivalent) was spread when reinstalling the PCB6. Spread the silicone compound on IGBT.

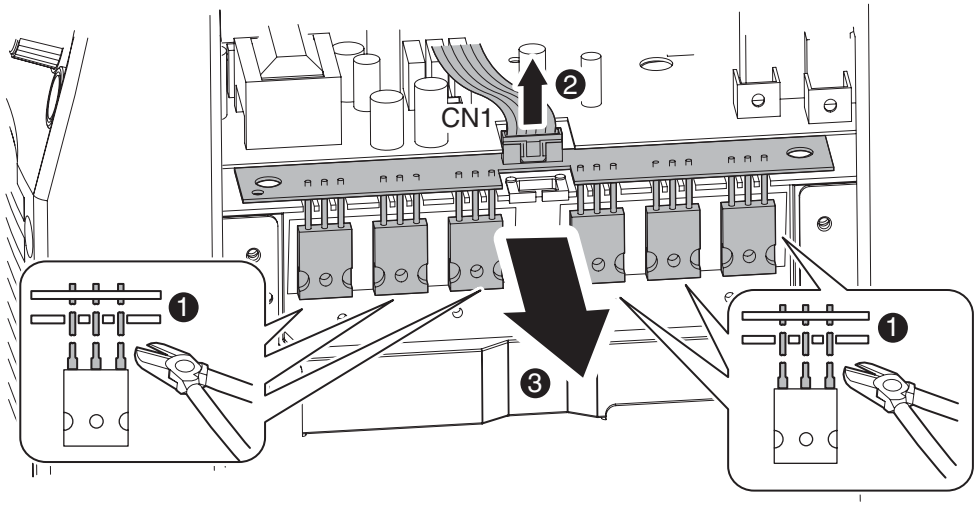


7.3.7 PCB7 (WK-5460) and Q3A-Q4C “Primary IGBT”

1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the four screws and two IGBT Spring Clips. Remove the cables from edge holder.

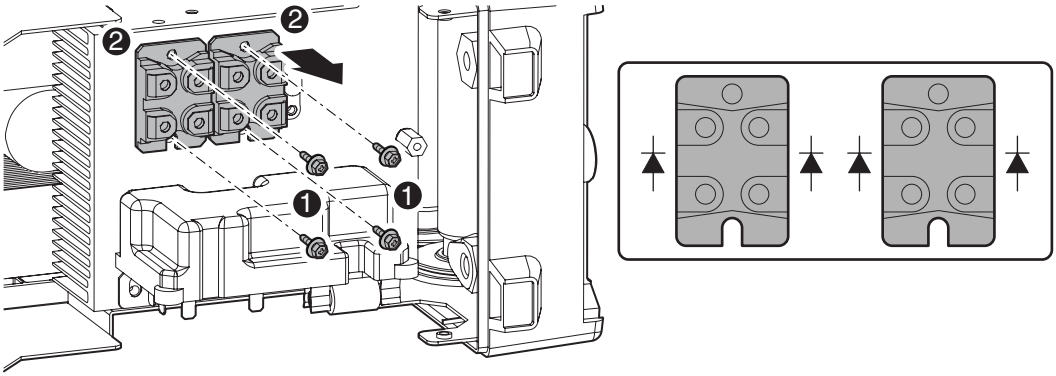


3) Disconnect the connector CN1 on the PCB6. Cut the lead of the Q3-Q4C.
   - Remember to install new Silicone Rubber Sheets where silicone compound (Shinetsu Silicone G-747 or equivalent) was spread when reinstalling the PCB7. Spread the silicone compound on IGBT.



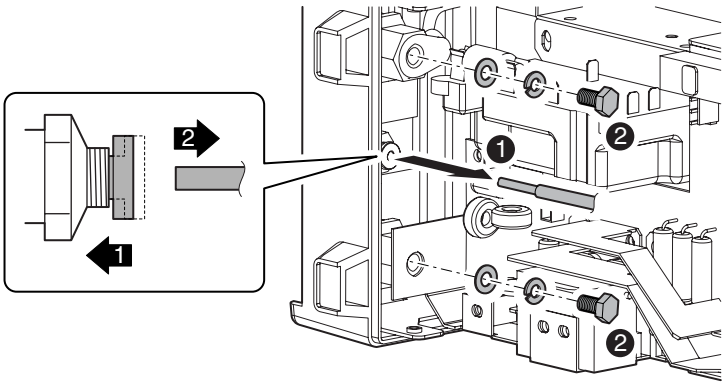
7.3.8 D2 and D3 “Secondary Diode”

1) Remove the Side Panel. [See section “6.1-1”]
2) Remove PCB3 (WK-5569) and T1. [See section “7.3-3”]
3) Remove six screws and then detach the D2 and D3.
   - Do not have the wrong direction of the diodes when reinstalling.
   - Before installing a new diode, apply a uniform coat of silicone compound (Shinetsu Silicone G-747 or equivalent) on the base.

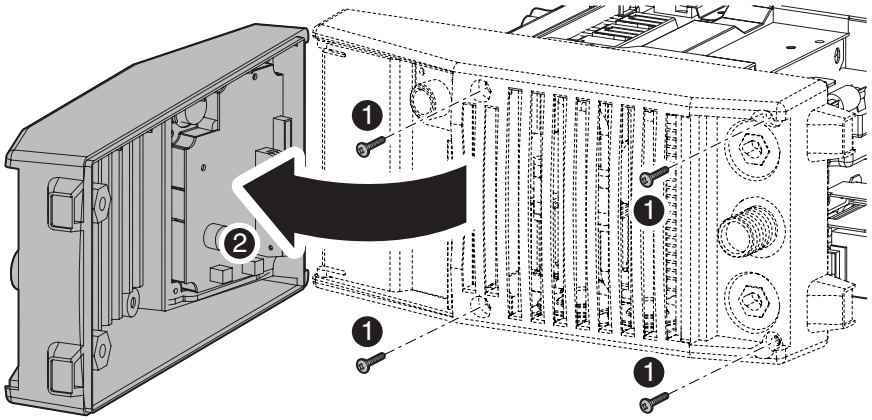


7.3.9 C.C. “Coupling Coil” and FCH1 “Reactor”

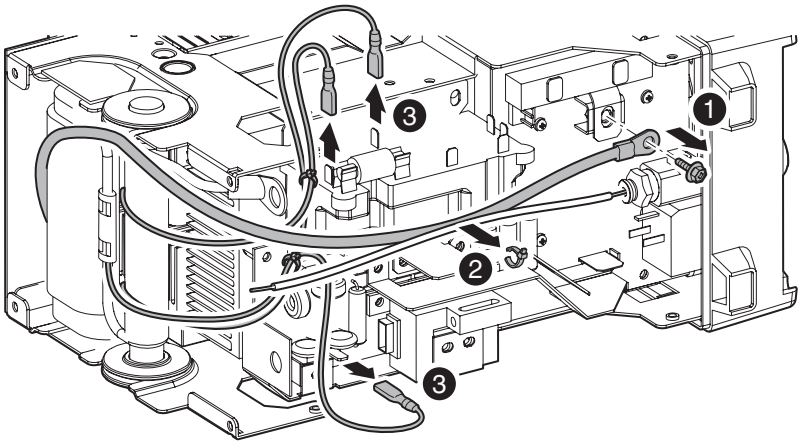
1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the Gas Tube. Remove the two bolts, two toothed washers, and the terminal.



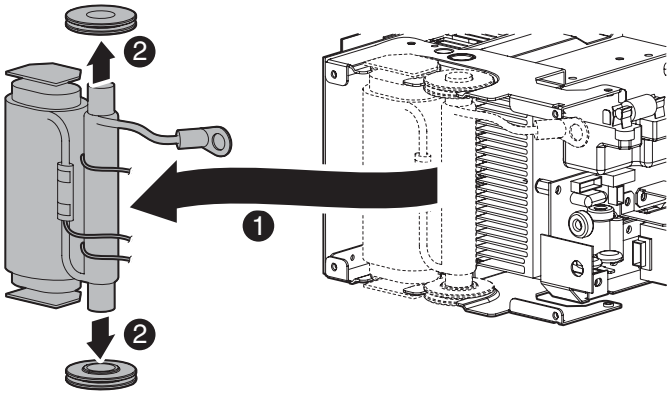
3) Remove the four screws and the Front Panel.



4) Remove the screw and then remove the cable. Remove the two terminals from HF. UNIT. Remove the terminal from PCB3.

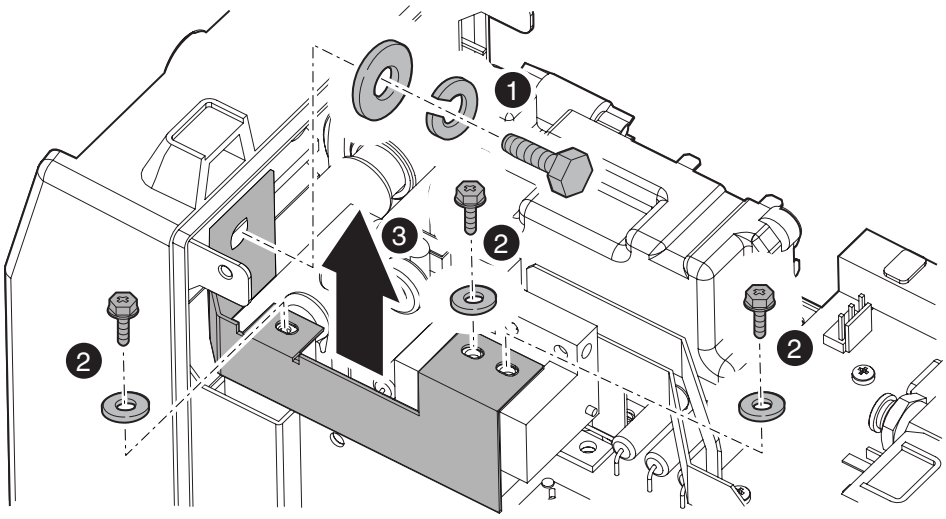


5) Remove the C.C. and FCH1.

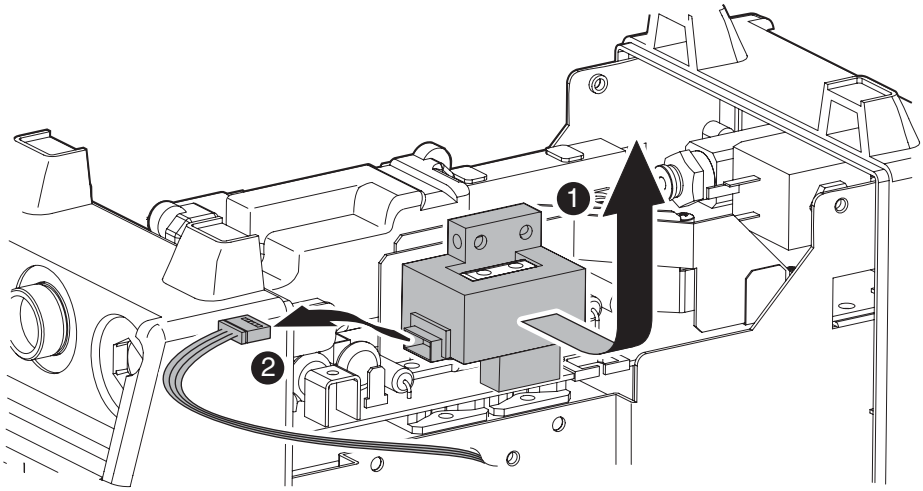


7.3.10 CT1 “Hole Current Trans” ⊕

1) Remove the Side Panel. [See section “11.1-1”]
2) Remove the bolts, the spring, and the washer. Remove the three screws and then remove the Output Bus Bar.

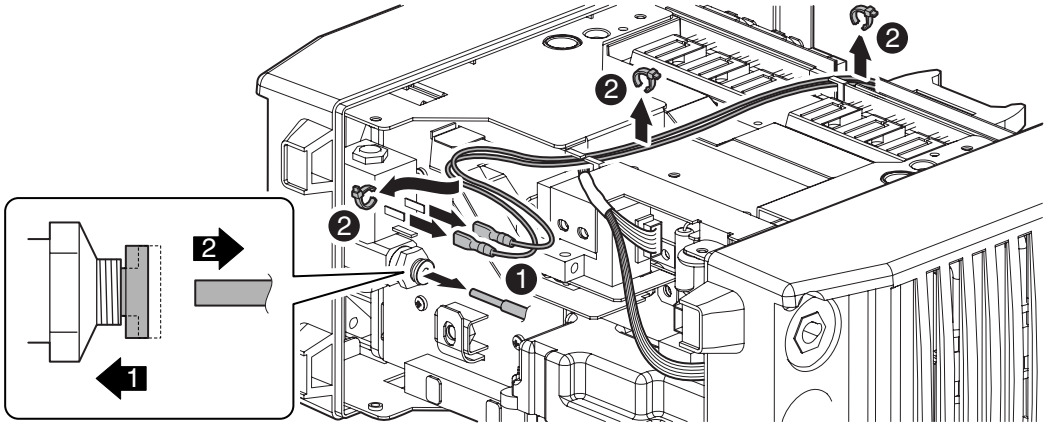


3) Remove the CT1. Disconnect the connector.

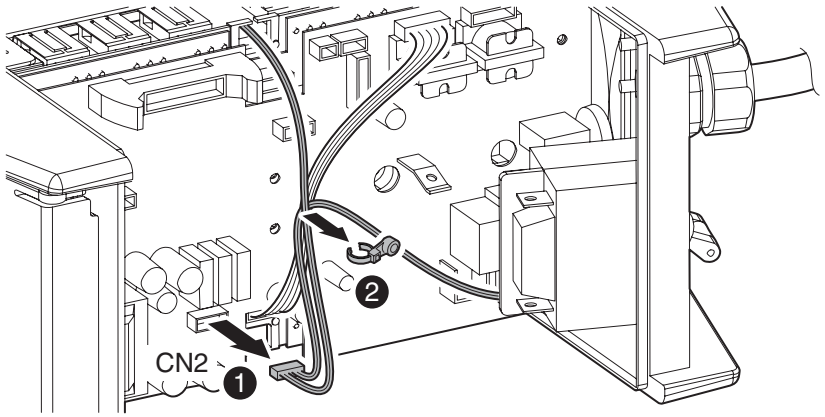


7.3.11 FAN1 “Cooling Fan”

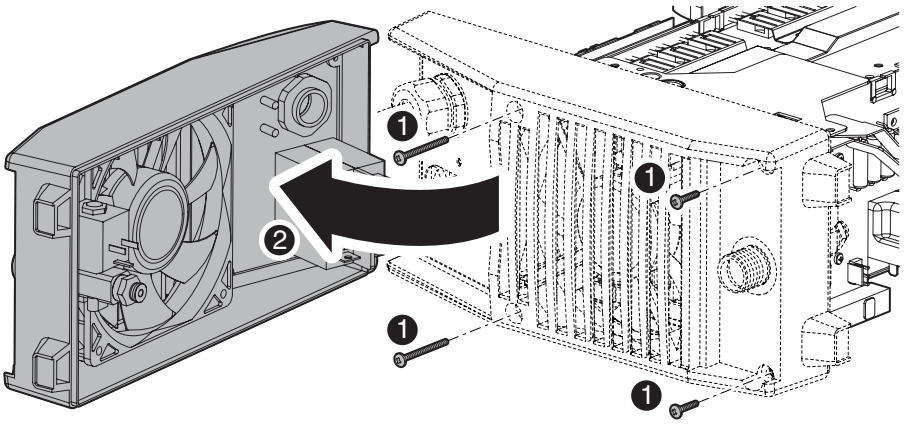
1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the Gas Tube. Remove the two terminals and Cut the three snap bands.



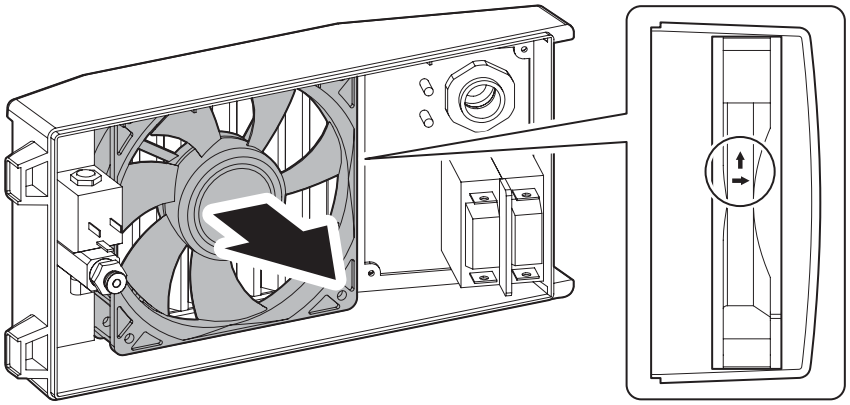
3) Disconnect the connector CN2 on the PCB1 and Cut the snap band.



4) Remove the four screws and then open the Rear Panel.

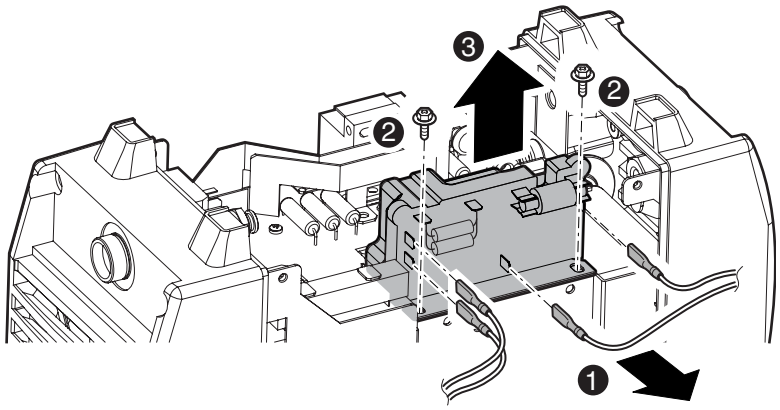


5) Remove the FAN1.
   • Do not have the wrong direction of the fan when reinstalling.



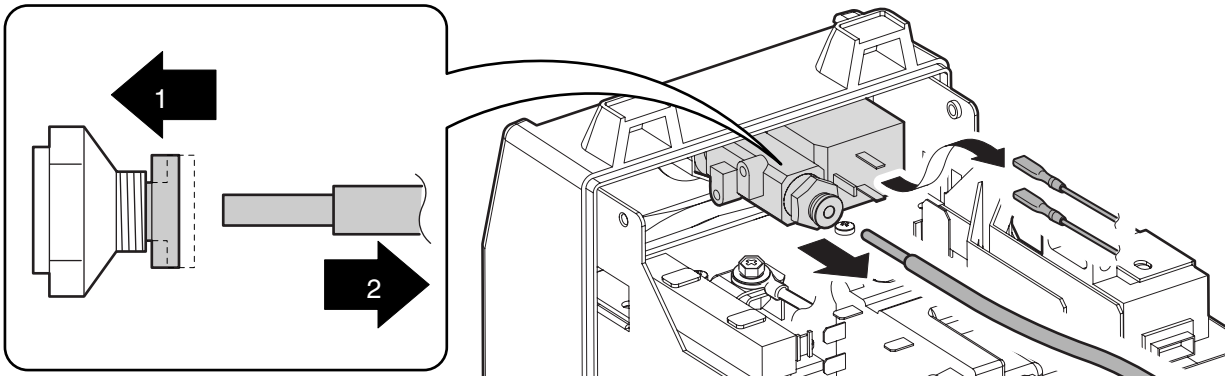
7.3.12 HF UNIT1 “High Frequency Unit”

1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the high frequency gap. Remove the four terminals.
3) Remove the two screws and the two washers. Detach the HF UNIT1.

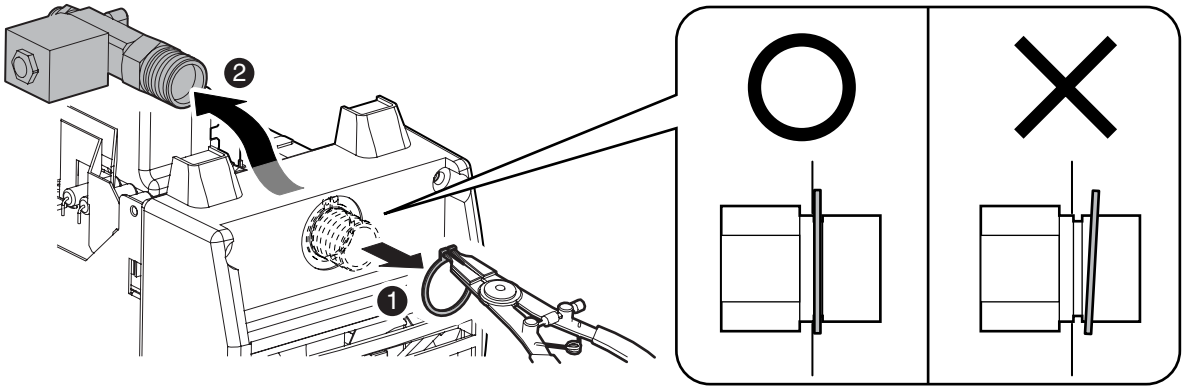


7.3.13 SOL1 “Solenoid GAS Valve” ⊕

1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the Gas Tube and two terminals.

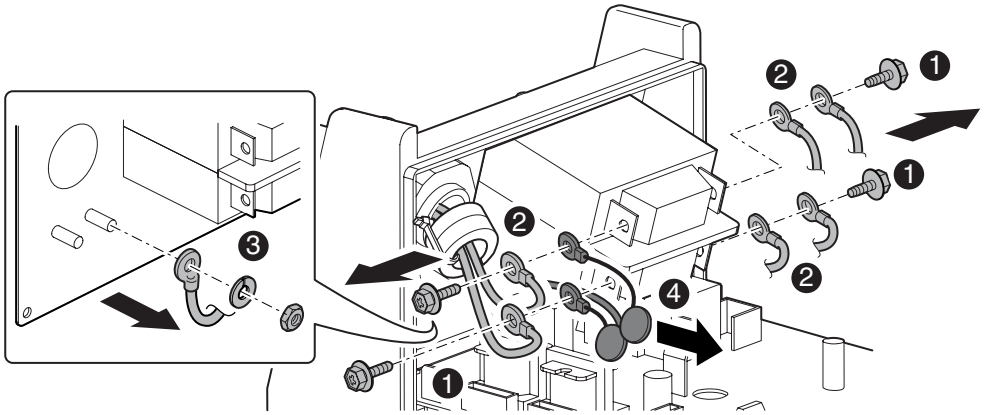


3) Remove the C-ring and then detach the SOL1.
   • When reinstalling, make sure that the C-ring seats in the solenoid valve groove.

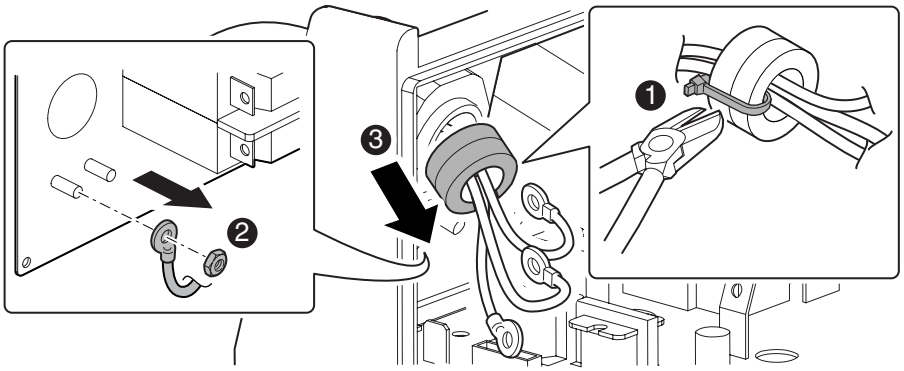


7.3.14 C101-C102 “Capacitor”, L101 “Ring Core” and S1 “Switch” ⊕

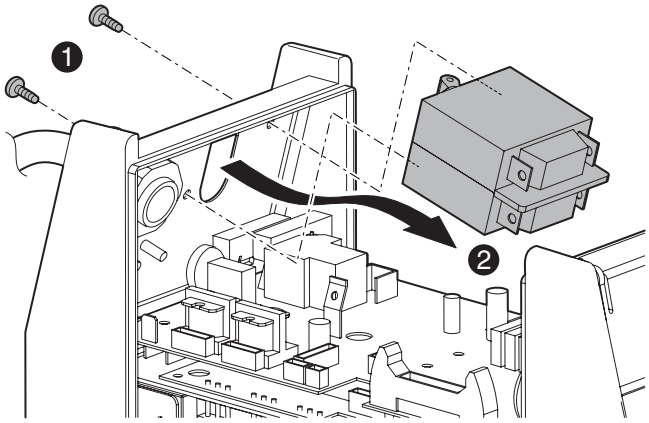
1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the four screws and the six cables. Remove the one nut and one terminal. Remove the C101-C102.



3) Cut off the snap band. Remove the L101 from the Input Cable.

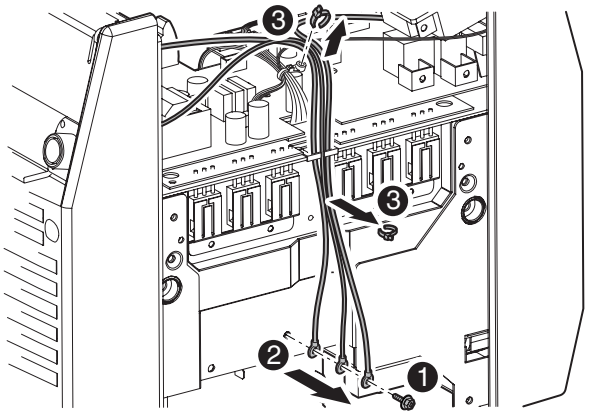


4) Remove the two screws and then detach the S1.

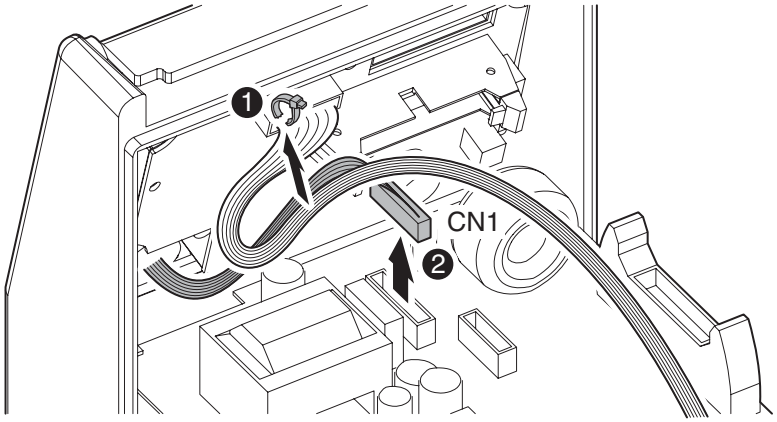


7.3.15 CON1 “Remote Receptacle”

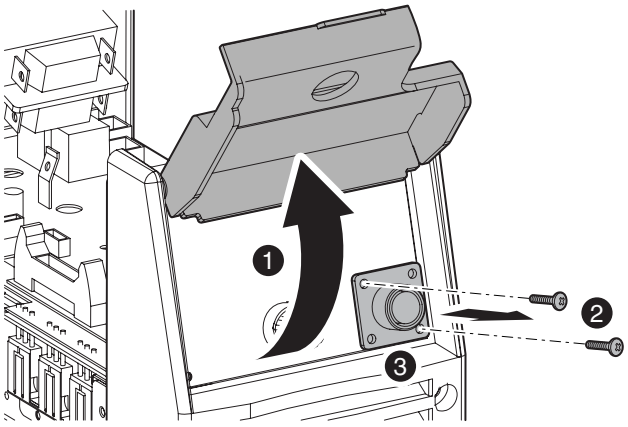
1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the screw and then three ground cables. Cut the two snap bands.



3) Cut the snap band and disconnect connector CN1 on the PCB1.

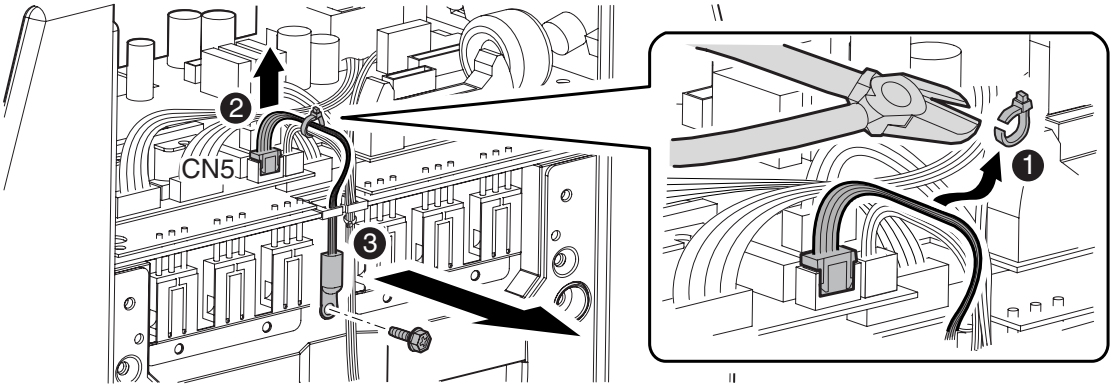


4) Open the Panel Protects. Remove the two screws and the CON1.



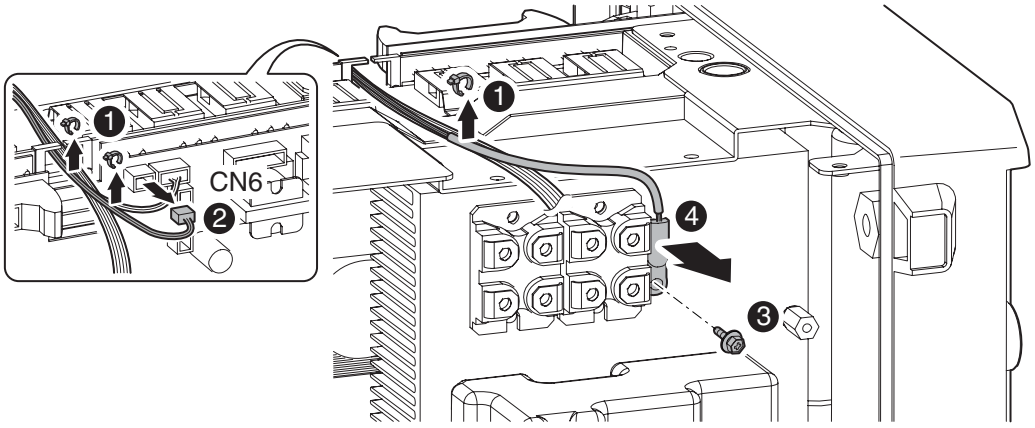
7.3.16 TH1 “Primary Thermistor”

1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the snap band. Disconnect the connector CN5 on the PCB1. Remove the screw and then detach the TH1. Before installing a new Thermistor, apply a uniform coat of silicone compound (Shinetsu Silicone G-747 or equivalent) on the base.



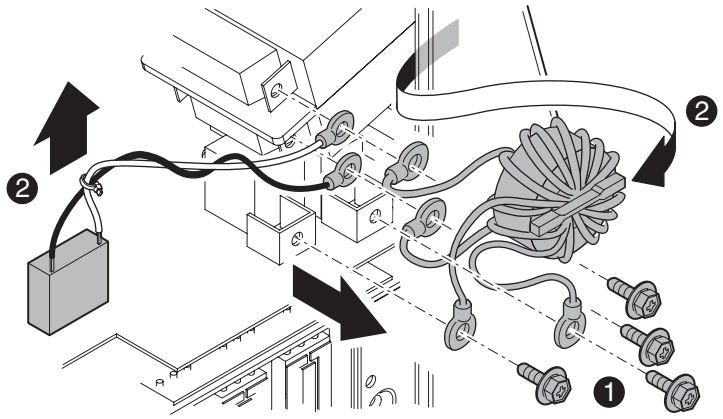
7.3.17 TH2 “Secondary Thermistor”

1) Remove the Side Panel. [See section “6.1-1”]
2) Remove PCB3 unit. [See section “7.3-3”]
3) Cut the three snap bands. Disconnect the connector CN6 on the PCB1. Remove the screw and then detach the TH1. Before installing a new Thermistor, apply a uniform coat of silicone compound (Shinetsu Silicone G-747 or equivalent) on the base.



7.3.18 C103 “Capacitor” and L102 “Reactor”

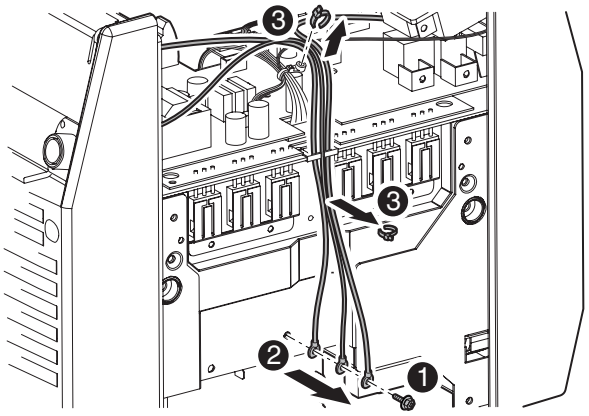
1) Remove the Side Panel. [See section “6.1-1”]
2) Remove four screws, six terminals. Remove the C103 and L102.



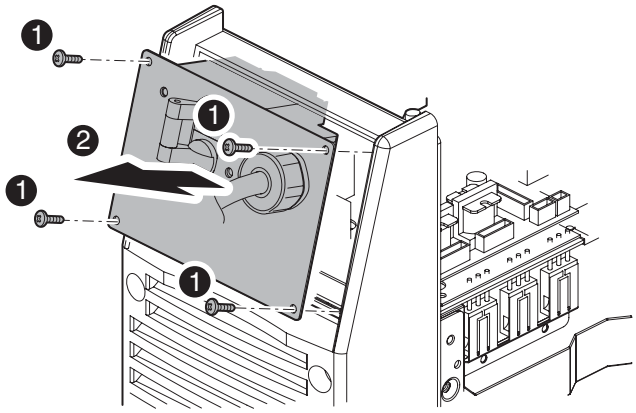
Note : When C103 is installed again, it is a thing fixed to former place on PCB3 by RTV silicon rubber.

7.3.19 L103 “Reactor”

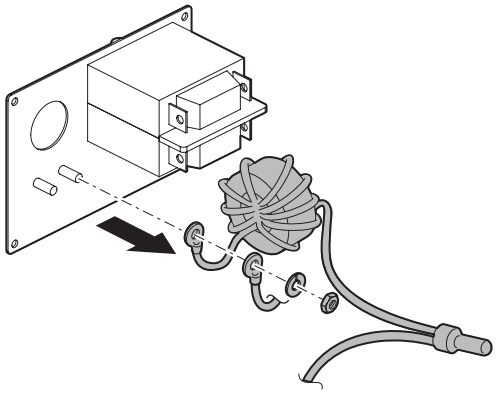
1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the L102. [See section “7.3-18”]
3) Cut off two snap bands and remove one screw, three terminals.



4) Remove four screws and open the Rear Control Cover.

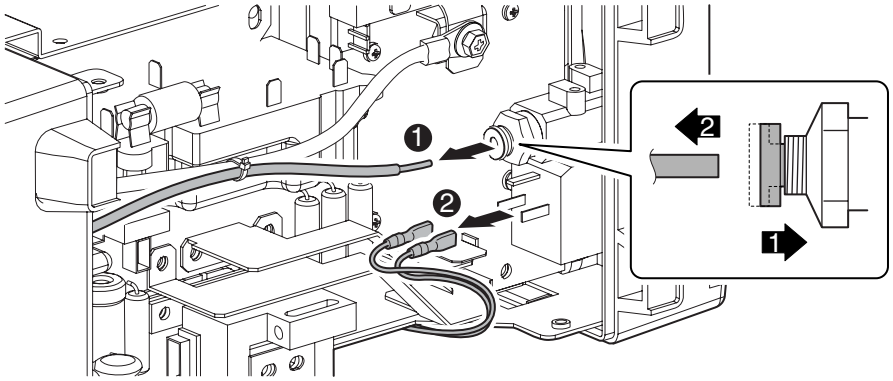


5) Remove one nut, one washer and two terminals. Remove the L103.

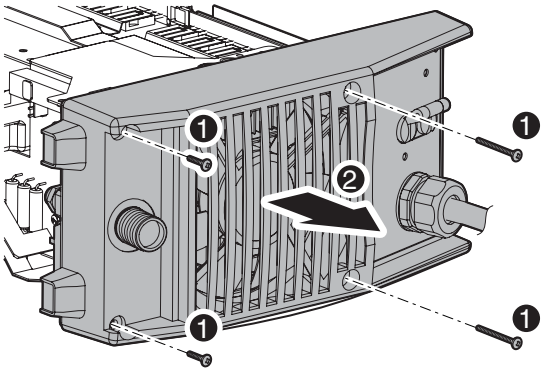


7.3.20 C2 “Capacitor” and R2 “Resistor”

1) Remove the Side Panel. [See section “6.1-1”]
2) Remove the Gas Tube and the two cables.

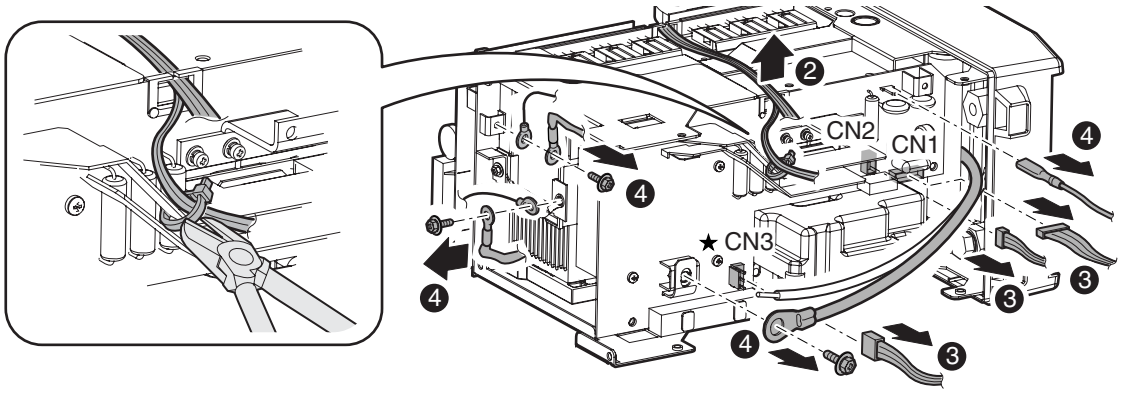


3) Remove the four screws and open the Rear Panel.



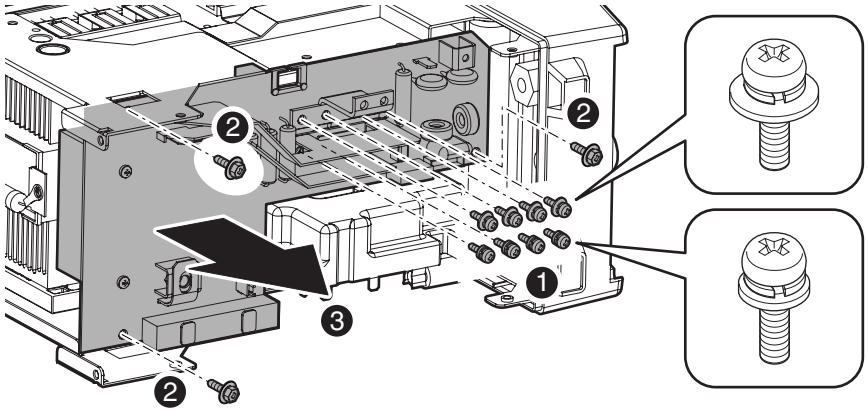
4) Remove the CT1. [See section “7.3-10”]

5) Cut the snap band and remove the cables. Disconnect the three connectors CN1-3 on the PCB3. Remove the three screws and the three cables. Remove the terminal.

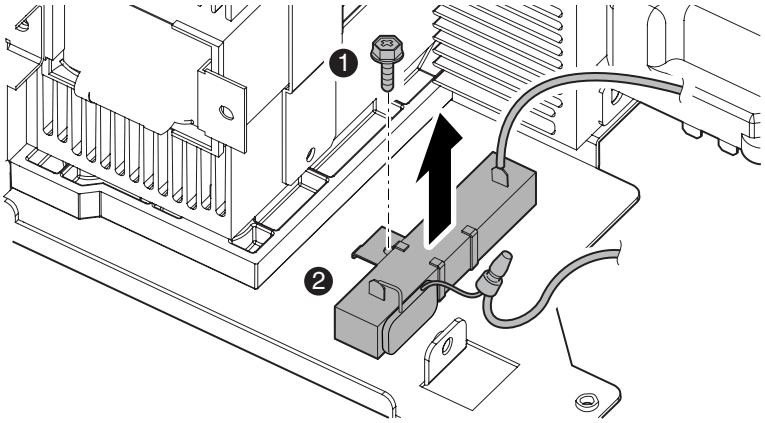


6) Remove the 11 screws and PCB3 unit.

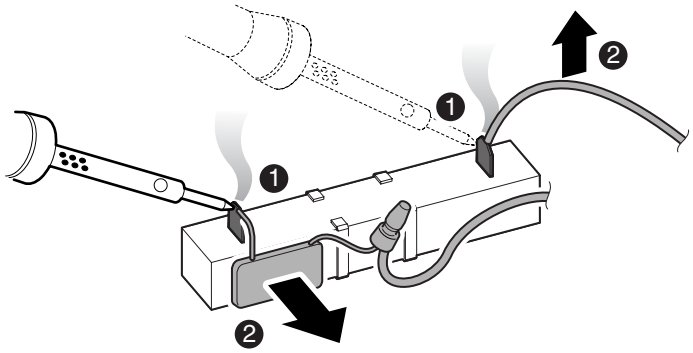
- Take care about the shape of the screw when you replace PCB3.



7) Remove the screw and C2 unit.



8) Remove the C2 with the soldering iron from the R2.



APPENDIX 1: OPTIONS AND ACCESSORIES

Description	Part No.	Details
17 Series air cooled TIG torch (suitable for TransTig 200Pi)	518710402	TIG torch with 4 metre cable & remote current control
26 Series air cooled TIG torch	538720401	TIG torch with 4 metre cable & remote current control
200 Amp lead set, 5 metre	646323	1 x 5m work lead; 1 x 5m electrode holder
400 Amp lead set, 8 metre	646325	1 x 8m work lead; 1 x 8m electrode holder
Slide controller	OTD 10/4013	200Pi, 200AC/DC slider only
	OTD 10/2004	300Pi, 300AC/DC, 400i slider only
Hand pendant	OTD 10/4014	200Pi, 200AC/DC hand pendant only
	OTD 10/2005	300Pi, 300AC/DC, 400i hand pendant only
Foot controller	OTD 10/4016	200Pi, 200AC/DC
	OTD 10/2007	300Pi, 300AC/DC, 400i
CIGWELD COMET argon regulator	301527	Regulator only
CIGWELD COMET argon flowmeter 0-15 lpm	301710	Flowmeter only
CIGWELD COMET argon flowmeter 10-40 lpm	301711	Flowmeter only
CIGWELD COMET argon regulator/flowmeter	301526	Regulator/flowmeter only
VAF-4 Wirefeeder (for 400i ONLY)	705700	VAF-4 wirefeeder, 8m interconnection, operating manual
VS212 Voltage sensing wirefeeder	W3512006	VS212 wirefeeder, operating manual
Tweco® 4 MIG Torch	717201	MIG torch with 3.6m cable, T4 connection
ArcMaster Pro Auto-darkening Helmet, 9-13 – blue	454294	Welding helmet, 2 x spare cover lenses, product bag, operating manual
ArcMaster Pro Auto-darkening Helmet, 9-13 – blue with graphic	454295	Welding helmet, 2 x spare cover lenses, product bag, operating manual
ArcMaster Pro Auto-darkening Helmet, 9-13 – black with graphic	454296	Welding helmet, 2 x spare cover lenses, product bag, operating manual

APPENDIX 2: PARTS LIST

1 Equipment Identification

All identification numbers as described in the Introduction chapter must be furnished when ordering parts or making inquiries. This information is usually found on the nameplate attached to the equipment. Be sure to include any dash numbers following the Specificazztion or Assembly numbers.

2 How To Use This Parts List

The Parts List is a combination of an illustration and a corresponding list of parts which contains a breakdown of the equipment into assemblies, subassemblies, and detail parts. All parts of the equipment are listed except for commercially available hardware, bulk items such as wire, cable, sleeving, tubing, etc., and permanently attached items which are soldered, riveted, or welded to other parts. The part descriptions may be indented to show part relationships. To determine the part number, description, quantity, or application of an item, simply locate the item in question from the illustration and refer to that item number in the corresponding Parts List.

TRANSTIG 200 Pi 700720

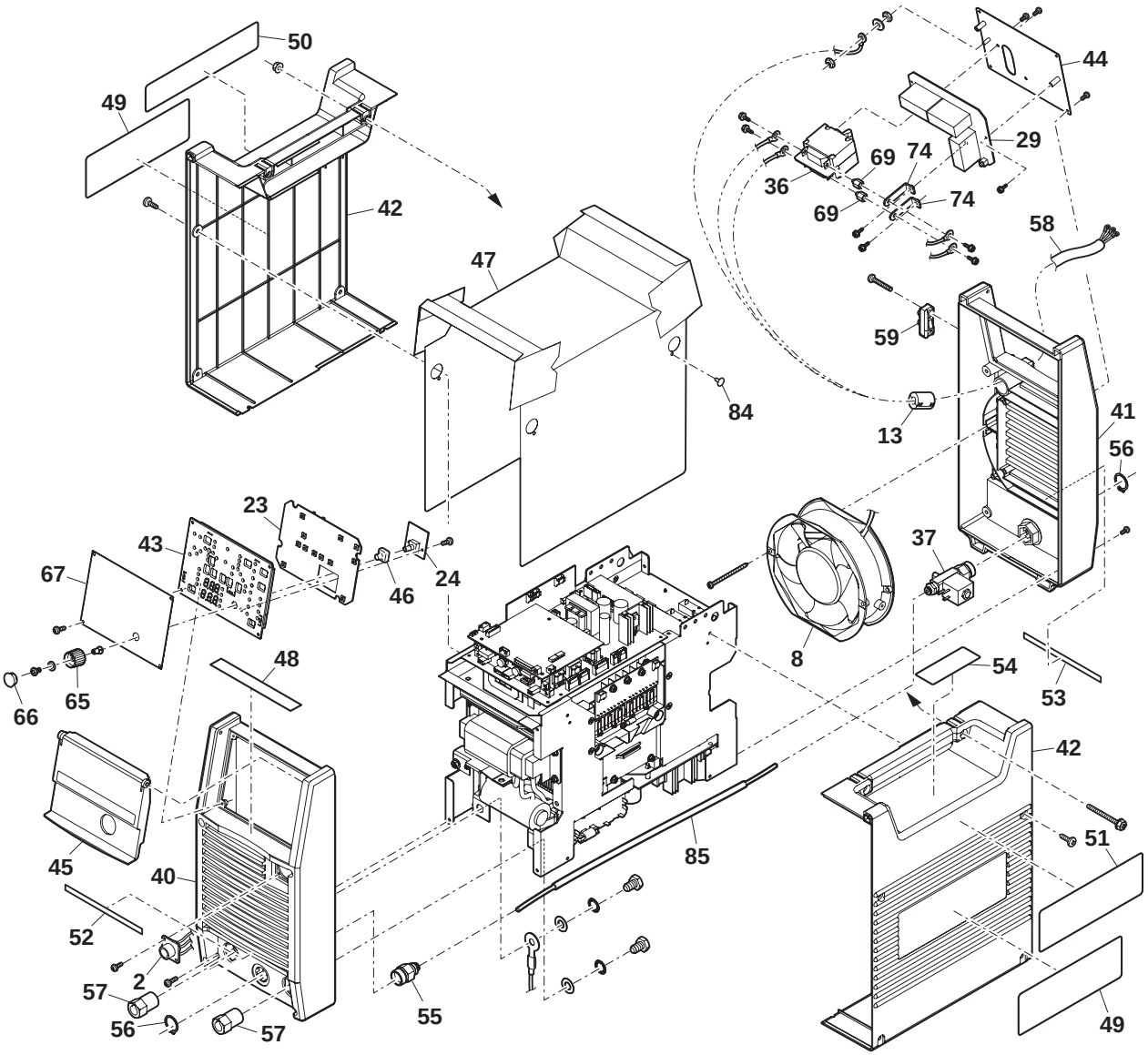
No.	DWG No.	Part No.	Description	Type & Rating	QTY.
1	CC1	W7001384	Coupling Coil, gen 3.1, IPS	F3A040600 200A CC	1
2	CON1	W7001595	Post, Output, gen 3.1, IPS	206433-1 8P (with Wiring Assembly)	1
3	CT2	W7001304	Transformer, gen 3.1, IPS	F2A503001 CT 1:40	1
4	D1	10-6628	Diode, gen 3.1, IPS	DFA50BA160	1
5	D2	10-6629	Diode, gen 3.1, IPS	DBA200UA60	1
6	D4	10-6629	Diode, gen 3.1, IPS	DBA200UA60	1
7	D5	10-6629	Diode, gen 3.1, IPS	DBA200UA60	1
8	FAN1	W7001307	Fan, gen 3.1, IPS	109E5724H507 DC 24V 16.8W	1
9	FCH1	W7001502	Inductor, gen 3.1, IPS	F3A285101 AC/DC FCH	1
10	HCT1	10-5003	Sensor, Current, gen 3.1, IPS	HC-TN200V4B15M 200A 4V	1
11	HF.UNIT1	W7001399	HF, Unit, gen 3.1, IPS	HF.UNIT (WK-4840 U04)	1
12		10-6633	HF, Gap, gen 3.1, IPS	U0A601100	1
13	L101	W7001400	Reactor, gen 3.1, IPS	ZCAT-3035-1330	1
14	L103	W7001605	Inductor, earth, gen 3.1, IPS	SNG-25B-600	1
15	PCB1	W7001402	PCB, gen 3.1, IPS	WK-5477 U01 MAIN_PCB	1
16	PCB2	W7001601	PCB, gen 3.1, IPS	WK-5596 U02 CVM CONTROL PCB	1
17	PCB3	W7001314	PCB, gen 3.1, IPS	WK-5548 U01 DDC PCB	1
18	PCB4	10-6635	PCB, gen 3.1, IPS	WK-4819 U01 DETECT PCB	1
19	PCB5	W7001417	PCB, gen 3.1, IPS	WK-5551 U01 CONECT PCB	1
20	PCB6	W7001727	PCB, gen 3.1, IPS	WK-5549 U07-1 200A CTRL PCB	1
21	PCB7	W7001423	PCB, gen 3.1, IPS	WK-5550 U01 FILTER PCB	1
22	PCB8-9	W7001318	PCB, gen 3.1, IPS	WK-5479 U01 GATE PCB (with	2
23	PCB10	W7001812	PCB,WK5527 U13,GEN3.1,IPS	WK-5527 U13 PANEL PCB	1
24	PCB11	W7001320	PCB, gen 3.1, IPS	WK-5528 U01 ENCODER PCB	1
25	PCB12	W7001594	PCB, gen 3.1, IPS	WK-5615 U01 DIODE SNUBBER PCB	1
26	PCB13	W7001433	PCB, gen 3.1, IPS	WK-5569 U01 GATE/INPOSE PCB	1
27	PCB14	W7001434	PCB, gen 3.1, IPS	WK-5570 U01 IGBT SNUBBER PCB	1
28	PCB16	W7001324	PCB, gen 3.1, IPS	WK-5499 U01 FILTER PCB	1
29	PCB17	10-6740	PCB, gen 3.1, IPS	WK-4917 U04 INPUT FILTER PCB	1
30	PCB18	W7001602	PCB, gen 3.1, IPS	WK-5861 CE FILTER PCB	1
31	Q13	10-6643	Transistor, gen 3.1, IPS	GCA200CA60 (with WK-3367 U04)	1
32	R2	W7001449	Resistor, gen 3.1, IPS	ERG3SJ220H 3W 22Ω	2
33	R3	10-5137	Resistor, gen 3.1, IPS	JG23V101J 68W 100Ω	2

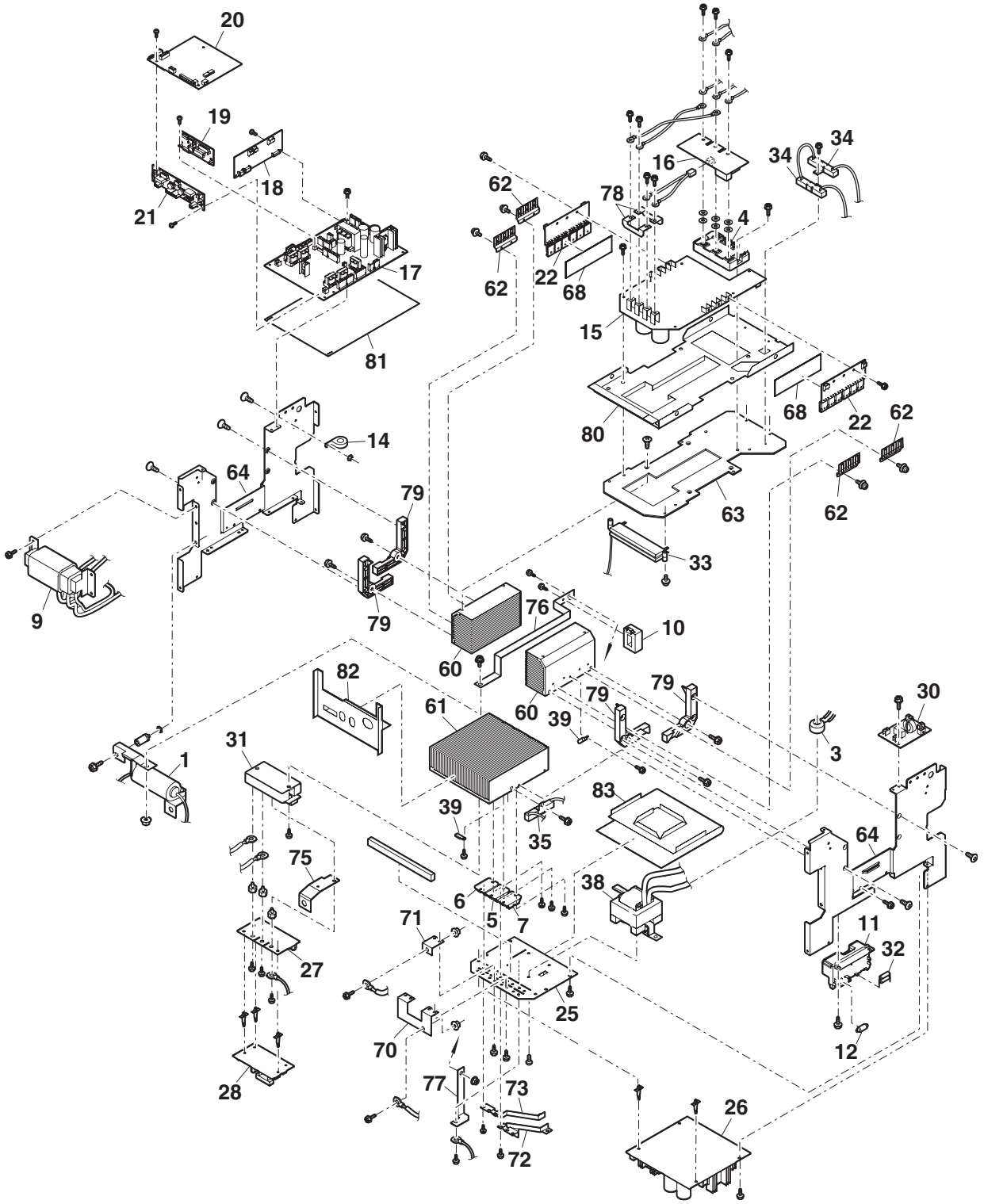
PARTS LIST

No.	DWG No.	Part No.	Description	Type & Rating	QTY.
34	R4-5	W7001452	Resistor, gen 3.1, IPS	MHS20A221KI 20W 220Ω	1
35	R6	W7001451	Resistor, gen 3.1, IPS	MHS20A101KI 20W 100Ω	1
36	S1	W7001453	Switch, gen 3.1, IPS	DCP-52SR50C-480V 2P-480V (185ACDC)	1
37	SOL1	W7001604	Solenoid Valve, gen 3.1, IPS	5505NBR1.5 DC24V 11VA/10W (with Gas Inlet and PC4-02)	1
38	T1	W7001456	Transformer, gen 3.1, IPS	F3A063501 200A MAIN TR	1
39	TH1, 2	10-5228	Thermistor, gen 3.1, IPS	ERTA53D203 20kΩ/25°CB=3950K	2
40		W7001465	Panel, Front, gen 3.1, IPS	E0D005301	1
41		W7001466	Panel, Rear, gen 3.1, IPS	E0D005501	1
42		W7001467	Label, Side, gen 3.1, IPS	E0D005407	2
43		W7001331	Case, cover, gen 3.1, IPS	E0C346000	1
44		W7001584	Cover, Rear, gen 3.1, IPS	JDA173200 (200ACDC)	1
45		W7001598	Cover, Protector, gen 3.1, IPS	E0C303200	1
46		10-6791	Cover, Encoder, gen 3.1, IPS	EBA514400	1
47			Cover, PCB, gen 3.1, IPS	E1B537600 (with Dustcover Sheet)	1
48		W7001600	Label, Name, gen 3.1, IPS	N4A932900 (200ACDC)	1
49		W7001338	Label, Side, gen 3.1, IPS	N4A785200	2
50		W7001339	Label, 1 Warning, gen 3.1, IPS	N1B029700	1
51		W7001340	Label, 2 Warning, gen 3.1, IPS	N1B029800	1
52		W7001615	Label, output term gen 3.1, IPS	N4A670600	1
53		10-6733	Label, Gas Input, gen 3.1, IPS	N4A040700	1
54		W7001345	Label, VRD, gen 3.1, IPS	N4A919100	1
55		W7001603	Outlet, Gas, gen 3.1, IPS	EDA268800 (with PC4-02)	1
56		10-5184	C-Ring, gen 3.1, IPS		2
57		10-6660	Terminal, Output F, gen 3.1, IPS	TRAK-BE35-70S	2
58		N/A	Cable, Input, gen 3.1, IPS	132"10/3SOWBLKW/R650 (185ACDC)	1
59		10-6662	Clamp, Input, gen 3.1, IPS	EBA045800	1
60		W7001574	Heatsink, gen 3.1, IPS	E1B869900	2
61		W7001575	Heatsink, gen 3.1, IPS	E1B870000	1
62		W7001351	Spring Clip,IGBT, gen 3.1, IPS	E1B850100	4
63		W7001583	Chassis, PCB1, gen 3.1, IPS	J5B017400	1
64		W7001582	Chassis, gen 3.1, IPS	J3C356500	1
65		10-6665	Knob, gen 3.1, IPS	2621603	1
66		10-6666	Knob Cap, gen 3.1, IPS	3021104	1
67		W7001585	Cover, Protector, gen 3.1, IPS	N1B016200	1
68		W7001357	Sheet, rubber, gen 3.1, IPS	EDA227700	4
69		W7001358	Post, 1(M5), gen 3.1, IPS	EBA643600 (M5-M5)	3
70		W7001576	Bus Bar, 1 D-L, gen 3.1, IPS	ECA879500	1
71		W7001577	Bus Bar, 2 D-L, gen 3.1, IPS	ECA879600	1
72		W7001578	Bus Bar, 1 T-D, gen 3.1, IPS	ECA887200	1
73			Bus Bar, 2 T-D, gen 3.1, IPS	ECA887300	1
74		10-6868	Bus Bar, S1, gen 3.1, IPS	ECA321000	2
75		W7001610	Bus Bar, gen 3.1, IPS	ECA901400	1
76		W7001611	Bus Bar, T-CC, gen 3.1, IPS	ECA904200	1
77		W7001612	Bus Bar, T, gen 3.1, IPS	EDA022400	1
78		W7001613	Bus Bar, gen 3.1, IPS	EDA069100	2
79		W7001369	Insulated Board, gen 3.1, IPS	E1B872000	2
80		W7001607	Insulation Sheet, gen 3.1, IPS	E1B859500	1
81		W7001614	Insulation Sheet, gen 3.1, IPS	EDA174000	1

PARTS LIST

No.	DWG No.	Part No.	Description	Type & Rating	QTY.
82		W7001616	Sheet, dust cover F, gen 3.1, IPS	E1B935200 1	
83		W7001609	Sheet, dust cover R, gen 3.1, IPS	E1B935600	1
84		W7001374	Clip, gen 3.1, IPS	#74 NATURAL 4	4
85		W7001618	Hose, Nylon, gen 3.1, IPS	T0425B Nylon Hose L=0.5m	1
86		10-2020	Plug, Output, gen 3.1, IPS	TRAK-SK50	1
87		0-4955	Operating Manual, gen 3.1, IPS	Operating Manual	1

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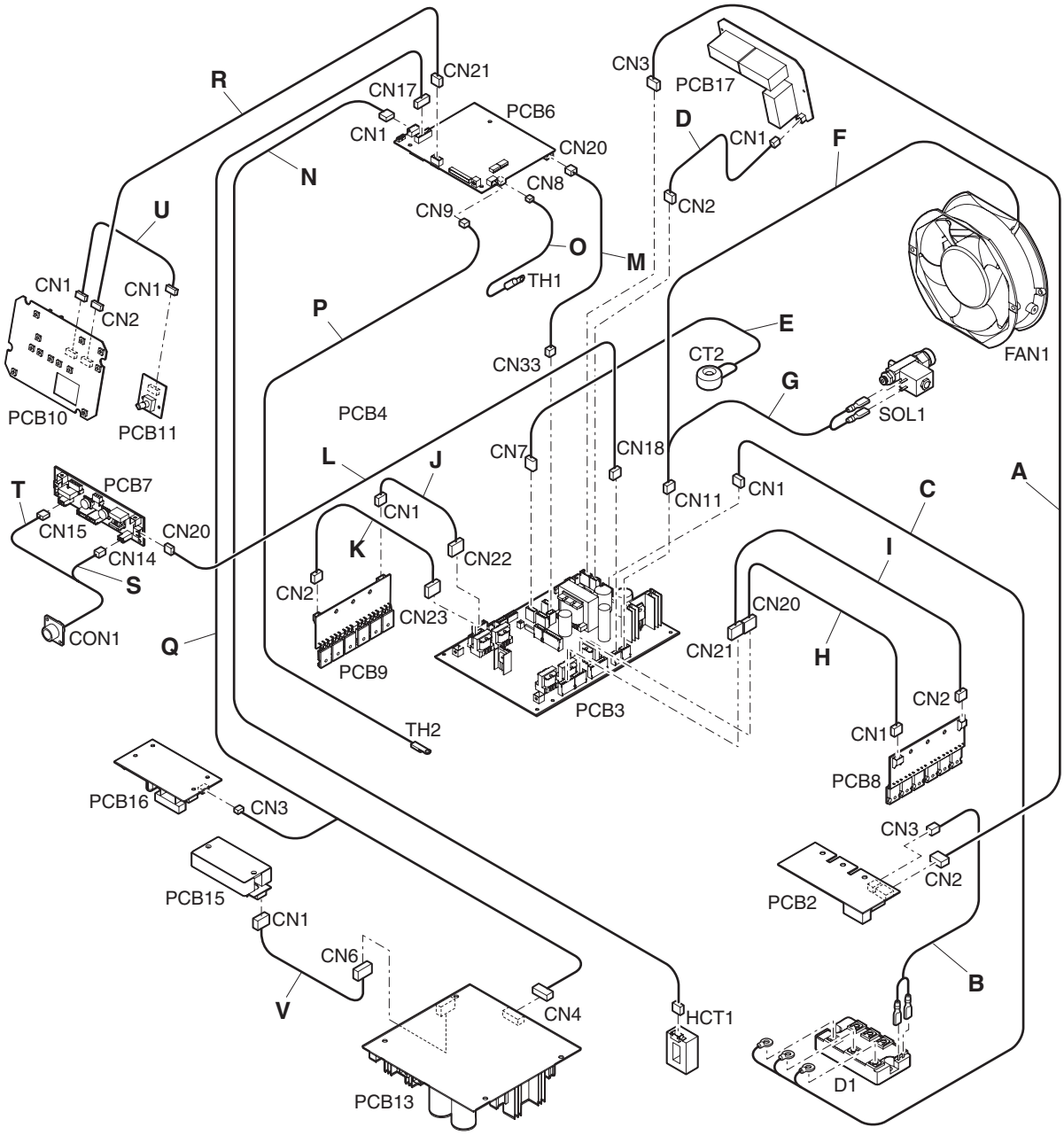
APPENDIX 3: CONNECTION WIRING GUIDE

	Destination				
A	PCB2	CN2	↔	PCB3	CN3
B	PCB2	CN3	↔	D1	
C	PCB3	CN1	↔	D1	
D	PCB3	CN2	↔	PCB17	CN1
E	PCB3	CN7	↔	CT2	
F	PCB3	CN11	↔	FAN1	
G				SOL1	
H	PCB3	CN20	↔	PCB8	CN1
I	PCB3	CN21	↔	PCB8	CN2
J	PCB3	CN22	↔	PCB9	CN1
K	PCB3	CN23	↔	PCB9	CN2
L	PCB3	CN18	↔	PCB7	CN20
M	PCB3	CN33	↔	PCB6	CN20
N	PCB6	CN1	↔	HCT1	
O	PCB6	CN8	↔	TH1	
P	PCB6	CN9	↔	TH2	
Q	PCB6	CN17	↔	PCB13	CN4
				PCB16	CN3
R	PCB6	CN21	↔	PCB10	CN2
S	PCB7	CN14	↔	CON1	
T		CN15			
U	PCB10	CN1	↔	PCB11	CN1
V	PCB13	CN6	↔	PCB15	CN1


R
CN17
CN21
PCB6
CN1
CN20
N
CN8
CN9
U
O
M
TH1
CN1
CN1
CN2
P
PCB10
PCB11
CN33
E
CT2
G
SOL1
FAN1
PCB4
L
J
CN7
CN18
CN11
CN1
C
A
T
PCB7
CN15
CN20
CN14
CN1
K
CN22
I
S
CN2
CN23
CON1
Q
PCB9
PCB3
CN20
CN21
H
CN2
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PCB8
TH2
PCB16
CN3
CN3
PCB15
CN2
PCB2
CN1
CN6
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CN4
HCT1
PCB13
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CN3
PCB17
D
CN1
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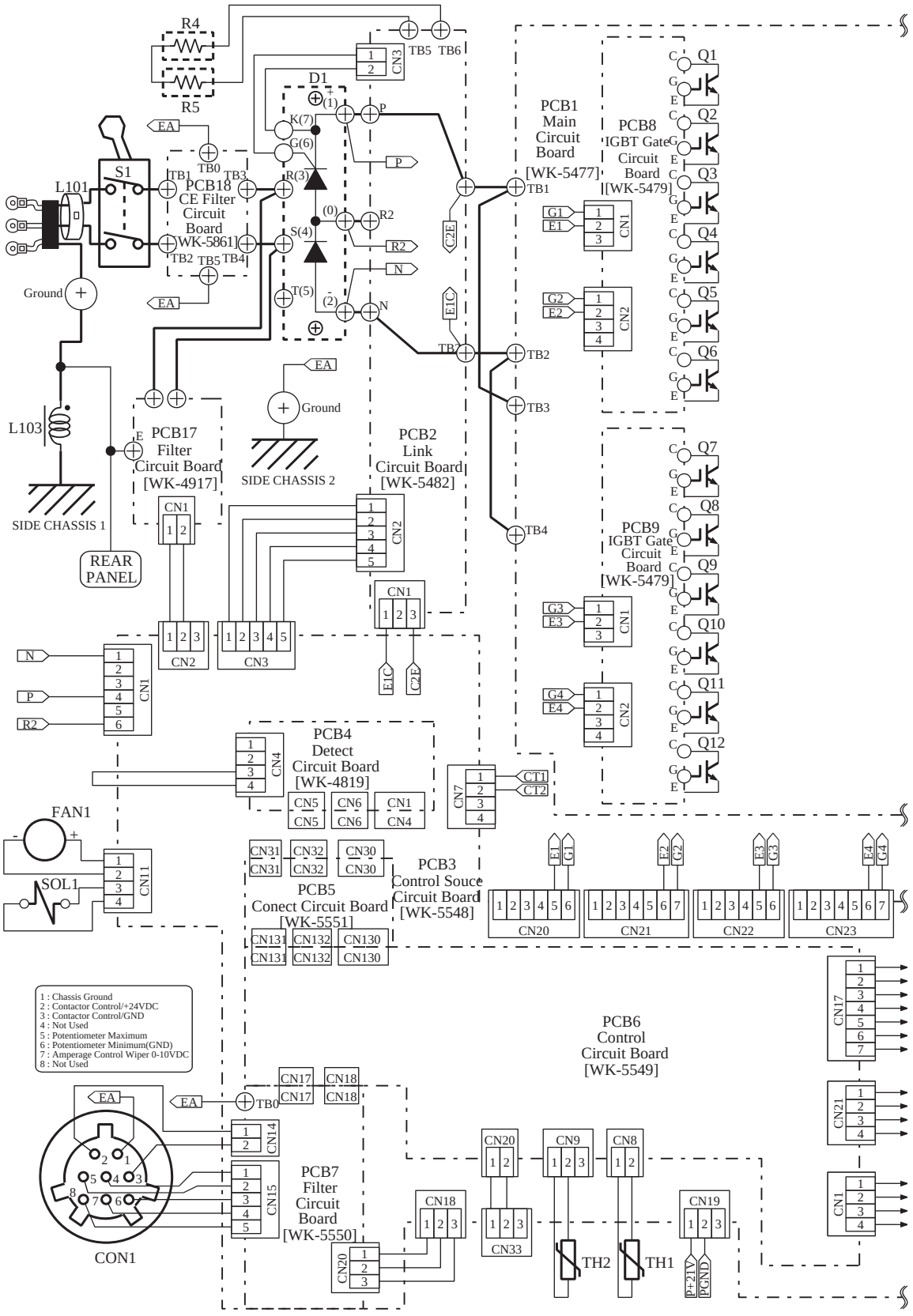
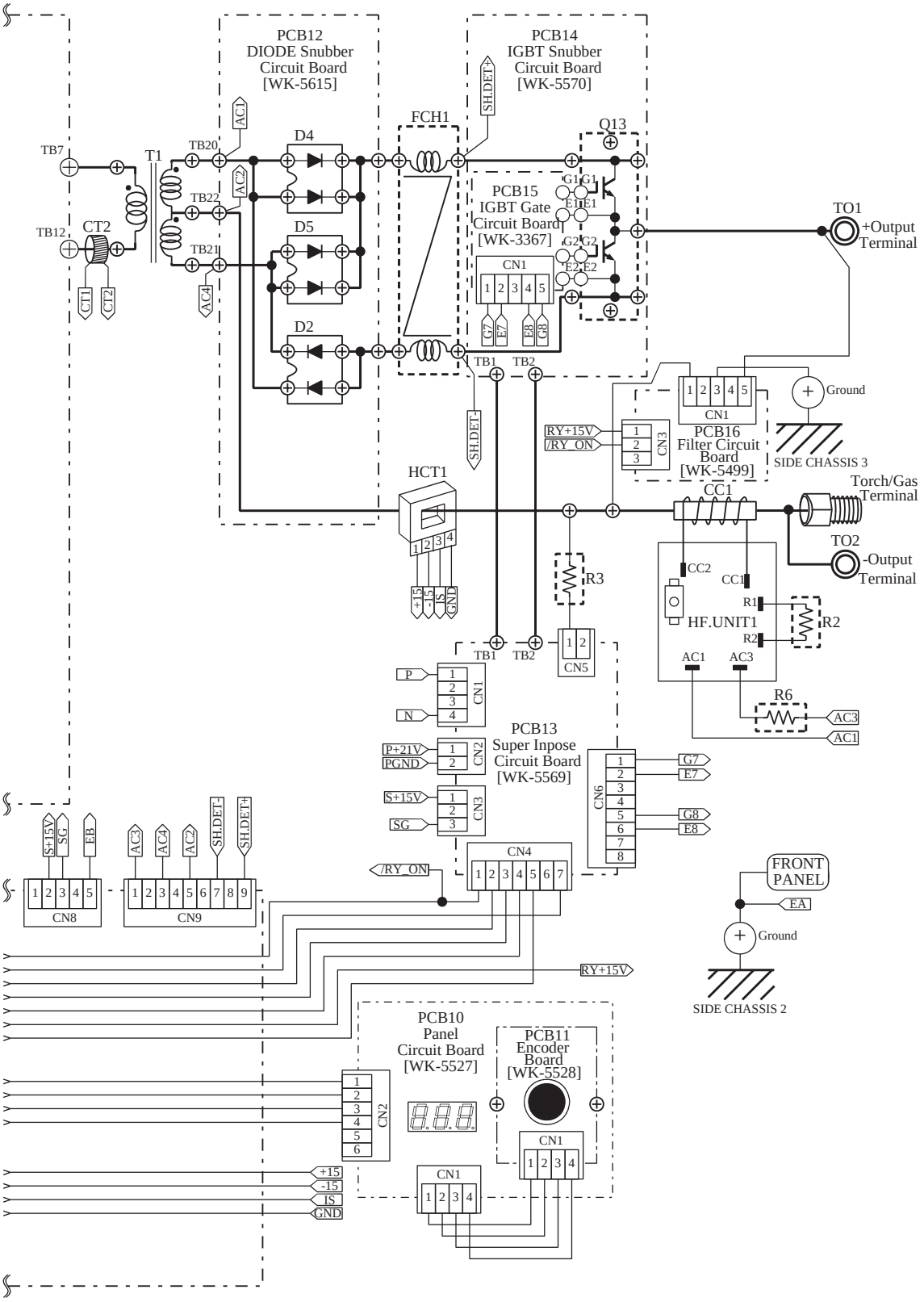
CN2

APPENDIX 4: INTERCONNECT DIAGRAM



INTERCONNECT DIAGRAM



APPENDIX 5: DIODE TESTING BASICS

Testing of diode modules requires a digital Volt/ Ohmmeter that has a diode test scale.Locate the diode module to be tested.Remove cables from mounting studs on diodes to isolate them within the module.Set the digital volt/ohm meter to the diode test scale.Using figure 1 and 2, check each diode in the module. Each diode must be checked in both the forward bias (positive to negative) and reverse bias (negative to positive) direction.

1. To check the diode in the forward bias direction, connect the volt/ohm meter positive lead to the anode (positive, +) of the diode and the negative lead to the cathode (negative, –) of the diode (refer to Figure 13-1). A properly functioning diode will conduct in the forward bias direction, and will indicate between 0.3 and 0.9 volts.
2. To check the diode in the reverse bias direction, reverse the meter leads (refer to Figure 13-1). A properly functioning diode will block current flow in the reverse bias direction, and depending on the meter function, will indicate an open or "OL".
3. If any diode in the module tests as faulty, replace the diode module.
4. Reconnect all cables to the proper terminals.

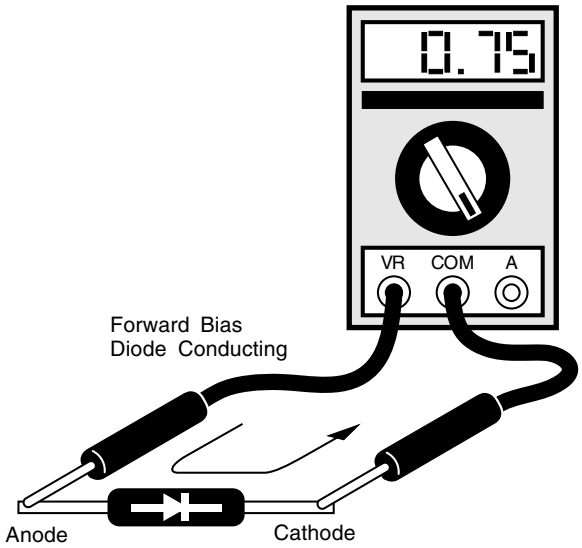


Figure 13-1: Forward bias diode test

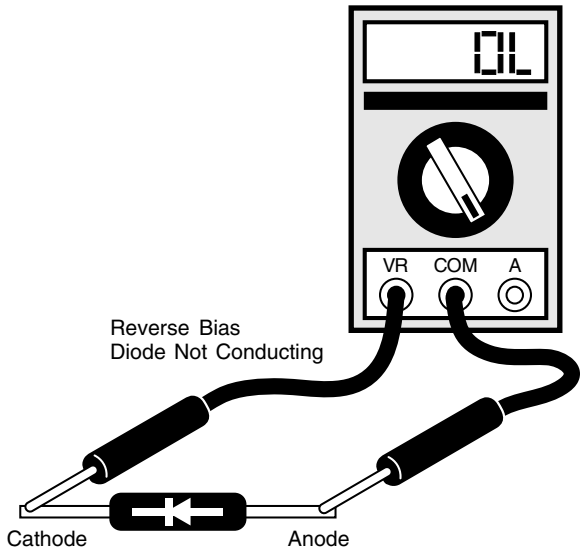


Figure 13-2: Reverse bias diode test

CIGWELD LIMITED WARRANTY

LIMITED WARRANTY: CIGWELD, A Thermadyne Company, hereafter, “CIGWELD” warrants to customers of its authorized distributors hereafter “Purchaser” that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the time period applicable to the CIGWELD products as stated below, CIGWELD shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with CIGWELD’s specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or accident, correct such defects by suitable repair or replacement, at CIGWELD’s sole option, of any components or parts of the product determined by CIGWELD to be defective.

CIGWELD MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHERS, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF LIABILITY: CIGWELD SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, SUCH AS, BUT NOT LIMITED TO, LOST PROFITS AND BUSINESS INTERRUPTION. The remedies of the Purchaser set forth herein are exclusive and the liability of CIGWELD with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by CIGWELD whether arising out of contract, negligence, strict tort, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liability is based. No employee, agent, or representative of CIGWELD is authorized to change this warranty in any way or grant any other warranty.

PURCHASER’S RIGHTS UNDER THIS WARRANTY ARE VOID IF REPLACEMENT PARTS OR ACCESSORIES ARE USED WHICH IN CIGWELD’S SOLE JUDGEMENT MAY IMPAIR THE SAFETY OR PERFORMANCE OF ANY CIGWELD PRODUCT. PURCHASER’S RIGHTS UNDER THIS WARRANTY ARE VOID IF THE PRODUCT IS SOLD TO PURCHASER BY NON-AUTHORIZED PERSONS.

The warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date CIGWELD delivered the product to the authorized distributor.

Terms of Warranty – December 2007

1. The Trade Practices Act 1974 (Commonwealth) and similar State Territory legislation relating to the supply of goods and services, protects consumers' interests by ensuring that consumers are entitled in certain situations to the benefit of various conditions, warranties, guarantees, rights and remedies (including warranties as to merchantability and fitness for purpose) associated with the supply of goods and services. A consumer should seek legal advice as to the nature and extent of these protected interests. In some circumstances, the supplier of goods and services may legally stipulate that the said conditions, warranties, guarantees, rights and remedies are limited or entirely excluded. The warranties set out in Clause 2 shall be additional to any nonexcludable warranties to which the Customer may be entitled pursuant to any statute.

2. Subject to Clause 3. CIGWELD gives the following warranties to the Customer:

   Insofar as they are manufactured or imported by CIGWELD, goods will upon delivery be of merchantable quality and reasonably fit for the purpose for which they are supplied by CIGWELD.

   CIGWELD will repair or, at its option, replace those of the goods which, upon examination, are found by CIGWELD to be defective in workmanship and/or materials.

   CIGWELD reserves the right to request documented evidence of date of purchase.

3. The Warranty in Clause 2;

   Is conditional upon:

   The Customer notifying CIGWELD or our Accredited Distributor in writing of its claim within seven (7) days of becoming aware of the basis thereof, and at its own expense returning the goods which are the subject of the claim to CIGWELD or nominated Accredited Distributor/Accredited Service Provider. The goods being used in accordance with the Manufacturer's Operating Manuals, and under competent supervision.

   Does not apply to:

   Obsolete goods sold at auction, second-hand goods and prototype goods.

   Breakdown or malfunction caused by accident, misuse or normal wear and tear.

   Repairs or replacement made other than by CIGWELD or Accredited Service Providers, unless by prior arrangement with CIGWELD.

   Replacement parts or accessories which may affect product safety or performance and which are not manufactured, distributed or approved by CIGWELD.

4. CIGWELD declares that, to the extent permitted by law, it hereby limits its liability in respect of the supply of goods which are not of a kind ordinarily acquired for personal, domestic or household use or consumption to any one or more of the following (the choice of which shall be at the option of CIGWELD).

   The replacement of the goods or the supply of equivalent goods.

   The repair of goods.

   The payment of cost of replacing the goods or acquiring equivalent goods.

   The payment of the cost of having goods repaired.

5. Except as provided in Clauses 2 to 4 above, to the extent permitted by statute, CIGWELD hereby excludes all liability for any loss, damage, death or injury of any kind whatsoever occasioned to the Customer in respect of the supply of goods including direct, indirect, consequential or incidental loss, damage or injury of any kind.

Warranty Schedule – December 2007

These warranty periods relate to the warranty conditions in clause 2. All warranty periods are from date of sale from the Accredited Distributor of the equipment. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date CIGWELD delivered the product to the Accredited Distributor. Unless otherwise stated the warranty period includes parts and labour. CIGWELD reserves the right to request documented evidence of date of purchase.

CIGWELD PROFESSIONAL INVERTER WELDING EQUIPMENT	WARRANTY PERIOD	LABOR
Transtig 200 Pi, Transtig 200 AC/DC, Transarc 300 Si, Transtig 300 Pi, Transtig 300 AC/DC, Transmig 400 i		
Original Main Power Magnetics	3 years	2 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semi-conductors	2 years	2 years
All other circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors	1 year	1 year

Please note that the information detailed in this statement supersedes any prior published data produced by CIGWELD.

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